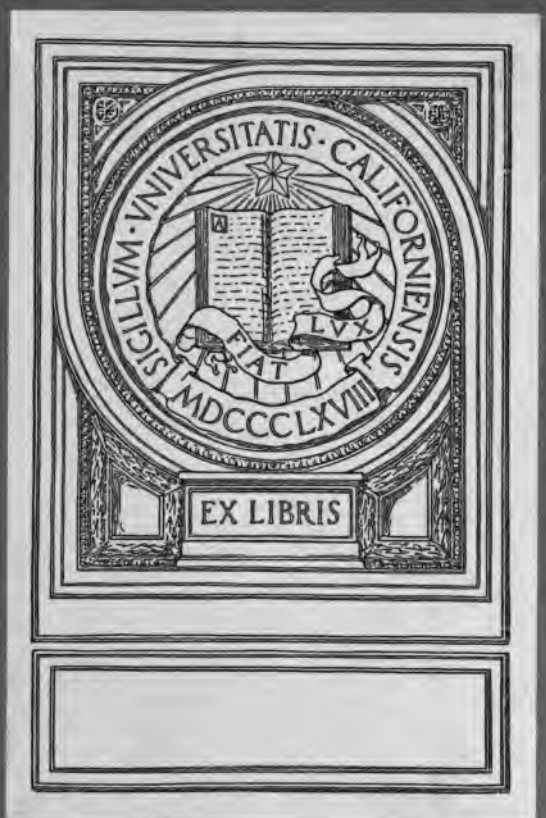
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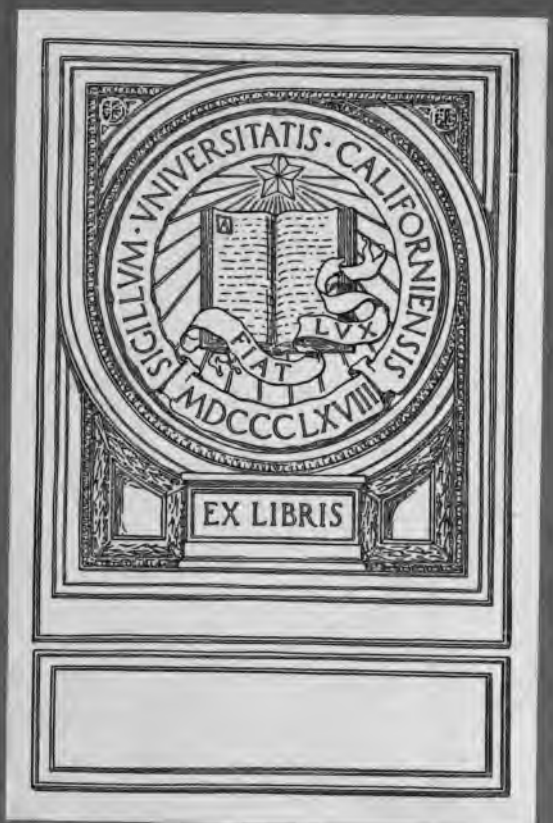
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WAITING IN THE WILDERNESS

BOOKS BY ENOS A. MILLS

WAITING IN THE WILDERNESS
ADVENTURES OF A NATURE GUIDE
THE GRIZZLY, OUR GREATEST WILD ANIMAL
IN BEAVER WORLD
ROCKY MOUNTAIN WONDERLAND
STORY OF A THOUSAND-YEAR PINE
WILD LIFE ON THE ROCKIES
STORY OF ESTES PARK, GRAND LAKE, AND ROCKY MOUNTAIN NATIONAL PARK
STORY OF SCOTCH
SPELL OF THE ROCKIES
YOUR NATIONAL PARKS

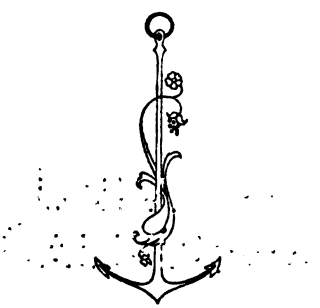
Photo by W. F. Ervin

Pigeon and Turret Peaks from Emerald Lake, San Juan mountains, southern Colorado

WAITING *in the* WILDERNESS

BY

ENOS A. MILLS



ILLUSTRATED FROM
PHOTOGRAPHS

GARDEN CITY, N. Y., AND TORONTO
DOUBLEDAY, PAGE & COMPANY
1921

To
JACK CHAPMAN

PREFACE

I WAS standing against a tall stump in the edge of a woods opening when a black bear walked by. He stopped, took a good look at me, bristled up, edged away, stopped for another look. "No," he seemed to say to himself, "that is just a stump." He walked out into the grassy opening, dug for mice, then ambled off into the woods.

This grass plot was a wilderness meeting-place for wild folks. Half a dozen wild-life trails crossed it or terminated in it. There were numberless air routes to and through it traversed by bats, butterflies, and birds. Often the wild life ceased to search for food, played their primitive games with enthusiasm, and sometimes they had battles or courtships.

Often I came back to this place to note the changes in the flowers or the growth of the birds in the neighbourhood nests.

Another day I sat just a big bump on a log, in the other side of the woods opening. A family of skunks, a coyote, and a number of grouse passed near and each of these appeared to

think that I was just a bump on a log. More than a score of species of birds this day alighted near by without giving me a second look. Toward evening a mink came out of the brook at the end of the log, looked at me three or four times, and then proceeded to take a dust bath. But a beaver who came out of the water had scarcely looked at me when he apparently caught my scent. With a splashing dive he disappeared down stream. Once as I lay on a pile of boulders a number of Bighorn sheep passed near by, utterly unconcerned at my form which they apparently mistook for a boulder.

Long before I thought of becoming a Nature Guide I moved slowly, so as not to alarm the thousand kinds of wild people of the woods who are eternally vigilant with eyes or ears for the sight or the scent of a swiftly moving object. And I went frequently to the same place and often waited long in the wilderness.

I tracked bears, hunted fossils—geologic animals—camped in beaver colonies, watched storms on the heights, going into the places where they roared the loudest, and went in search of coasting snowslides and landslides.

In every state in the Union there are numerous wild places in which if one wait in the wilderness he will see the wild folks come. Many of the unsuspected plays and ways of

wilderness folks have been seen by those who move through the woods slowly and who go frequently to the same place—these are the joys of waiting in the wilderness.

A number of the chapters in this book have been used by *The American Boy*, *Country Life in America*, and *The Youth's Companion*, and I appreciate the courtesy of the editors of these magazines in allowing me to reprint this material.

CONTENTS

LIST OF ILLUSTRATIONS

WAITING IN THE WILDERNESS

Waiting In The Wilderness

CHAPTER I

COASTING OFF THE ROOF OF THE WORLD

AT FOUR o'clock one clear, cold February morning I left my cabin with a pair of bear-paw snowshoes under my arm, a hatchet on my belt, kodak, field glass, thermometer, a few pounds of raisins, and elkskin sleeping bag. My cabin was on the eastern slope of the Continental Divide at nine thousand feet, and about twelve miles from the summit. I was off to explore the winter summit of the Divide, to see the snow and ice fields, frozen lakes, and also to have a look at the winter ways of the birds and animals that lived on the top, from twelve to thirteen thousand feet above sea level. Being alone I might hurry along and make the other side by night or might go leisurely, stopping to watch animals or turning aside for a look at anything that interested me.

The first welcome delay came when a few miles from my cabin. Eighteen mountain

sheep, single file, came suddenly out of the woods. They broke into a racing, romping gallop and scattered toward a frozen-over water hole. Eagerly they licked up the salty, alkaline dust around the shore. Three little lambs stuck out their tongues, smelled the ground, tasted it indifferently, and then began to play. By and by pairs of the older sheep played. They jumped, butted, and, standing on hind legs, fenced lightly and in a lively manner with their horns.

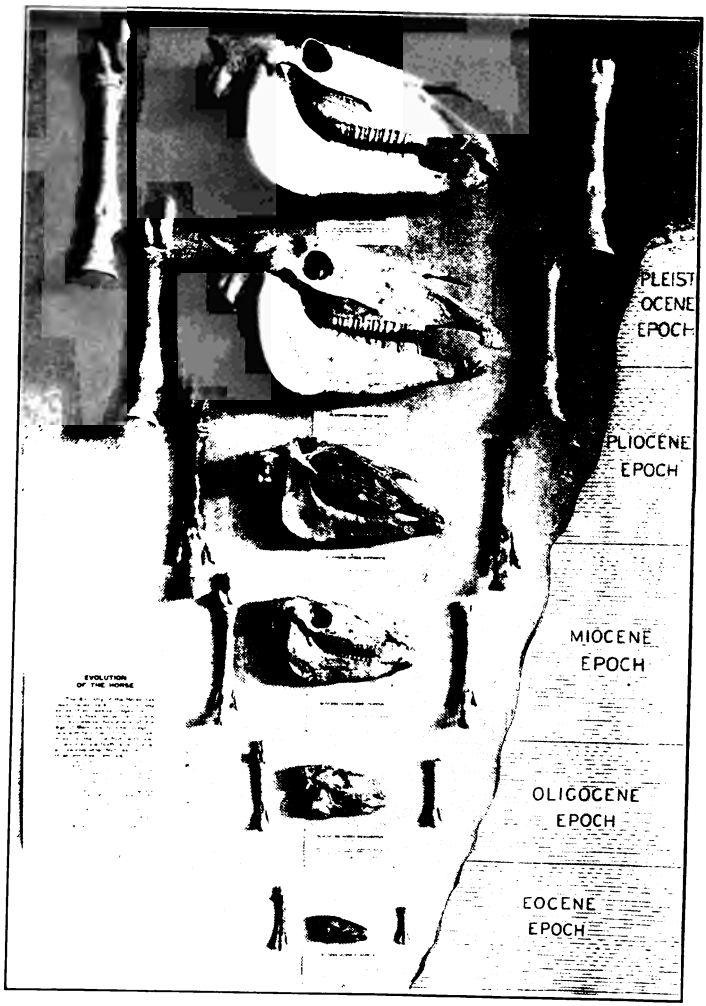
Large holes had been licked into the earth around this alkaline ooze to the depth of two or three feet. Sheep, like most other hoofed animals, appear to be fond of salt and make long journeys for it. These sheep lived on Battle Mountain above timberline, about five miles from this water hole.

After watching this flock for some time I started on for the top. There was no snow around, and the sunny day was warm as is common for many of the winter days in the Rocky Mountains. It was a warm climb up the steep slope. I looked back down the slope with my field glass. The old sheep were lying in the sunshine and the three little lambs were racing back and forth across the grassy opening which was enclosed by pines.

From the top of a bluff I looked down upon a beaver colony. Several ice-bound ponds were

Photo by Enos A. Mills

The way of the wind—timberline



These fossil bones, found in successive geologic formations of the Age of Mammals, show graphically the evolution of the horse. In the centre, skulls; at the left, hind feet; at the right, fore feet. The horse whose skull is shown at the bottom was the size of a fox terrier. It had four complete toes in fore foot, three in hind foot; middle toe a little larger than side toes. The Oligocene horse was the size of a sheep; three toes complete and reaching the ground, but middle toe enlarged; outer toe of the fore foot reduced to a short splint. The Miocene horse was the size of a Shetland pony; side toes complete but slender, and did not reach the ground in walking. The Pliocene horse was the size of a donkey; side toes complete but did not reach the ground. The Pleistocene horse was the size of our domesticated horse; side toes reduced to splints as in all the living species. At this point the race became extinct in America. The modern horse, shown at the top, is probably bred from wild races which inhabited Asia, Europe, and Northern Africa in prehistoric times.

shining in the sun. Climbing down to them I walked across the main pond. A large house, recently plastered, thrust up five feet through the ice. The four or five inches of mud and small sticks on the outside of the house were frozen as solid as stone. There was no sign that any animal had tried to break in through this covering. Near by a green brush heap stuck up through the ice. This brush pile, made up perhaps of two hundred small aspen trees, was the winter food supply. It rested on the bottom of the pond—was canned in the water. A beaver under the ice easily drags one of these green sticks from the food pile to his house entrance, also on the bottom of the pond, and then up to the floor of the house which is just above waterline. Rabbits hopped about in the shadows eating willow bark, but no other animals were in sight.

A climb of about a thousand feet above the beaver colony, through a dense, tall spruce forest, brought me to timberline. This timberline was a stretch of forest less than three feet high which appeared to have stood here as long as the peaks themselves. That each of these ancient-looking trees was hundreds of years old is certain. Farther along the timberline the trees lay upon the ground as though they had been flattened out by a steam roller. A few of these were about one foot in diameter and

twenty feet long. Here and there a badly wind-blown tree, with a thin spread of limbs on just one side, looked like a flagpole waving a tattered green banner. The windward side of the trunk was bare. In other places there were clumps of low-growing trees with their limbs entangled so thickly that the sunlight and the wind could scarcely break through.

One tree clump was deeply set in snow. It was as though a heavy white canvas had been spread over with one side left open. This was the place for me to spend the night. In similar, though better-covered places, many a bear has hibernated. In I pushed my sleeping bag. The night was cool, my thermometer showing ten degrees above zero, but so snug was this shelter that I slept on my sleeping bag and not in it. My fire was not a large one, but was arranged with backlogs which reflected a part of the heat into my almost windproof shelter.

These trees were 11,300 feet above sea level. This is 5,000 feet, almost a mile, higher up the mountain side than timberline in the Alps. In the Alps there is more snow and more cold, cloudy days. But the Rocky Mountains, having many warm, sunny days, provide a tree-growing climate and a place for plants and birds and animals to live a mile farther up into the sky than they can in the Alps.

A short distance from my timberline camp the next morning I came to the largest icicle I have ever seen. It overhung a cliff and must have been two hundred feet high. At the top it was twenty feet or more in diameter. The lower end stood on an icy foundation that overspread the rocks. While I was looking at a number of smaller icicles one broke away and fell with a crash. Chunks of this icicle as big as a huge barrel went rolling and bounding down the mountain side, one piece remaining unbroken until it crushed into the tree tops at timberline.

Snow covers small streams and protects them from freezing, preventing ice forming and filling in their channels. But during a winter of but little snow on mountain tops many a spring overflows its ice-filled channel. Climbing to the top of the cliff to which these icicles hung, I found a great fanlike span of ice over the surface. This was about three hundred feet wide at the face of the cliff. There was a spring at the point of the "V" or fan, some five hundred feet up the slope. Without snow to protect this spring water, it had frozen until the channel was filled with ice. Then the water had overflowed, spreading and freezing wider and deeper. This fanlike span of ice had taken about three months to form and in places was several feet deep. Over the face of the cliff were icicles of all sizes, many

beautiful columns, and many other attractive ice formations.

Farther up the slope I came upon a flock of ptarmigan—"white quail." They allowed me to come within a few yards of them without showing alarm. They were white, wore white leggings, were nearly as large as prairie chickens, and made a showy appearance as they walked along the brown, bare earth. Three of them flew a short distance and alighted on a near-by snowdrift. They matched the snow so well that I lost sight of them the instant they alighted. A quarter of a mile below the summit of the almost level mountain top a flock of sheep watched me pass within two hundred feet without alarm or retreat.

At last I stood on the very top of the Continental Divide and faced the noonday sun. I stretched out on the bare granite with my head and shoulders on the Atlantic slope and my feet on the Pacific slope. I remembered reading years before that one of the members of the Lewis and Clark exploration party had enjoyed standing for a minute with one foot on one side the Missouri River and one on the other side. He was standing near the top of the Continental Divide where the stream began.

I stood 12,500 feet above sea level and looked back down the Atlantic slope. There were

dwarfed and storm-battered trees at timberline with here and there a forest lake or a grassy opening showing down in the woods. There were only a few snowdrifts. Far out to the east about one hundred miles I could see the dry, brown plains in eastern Colorado.

But looking down the slope to the west everything was white. From a few hundred feet below where I was standing and westward for one hundred miles, snow lay deep over everything; forests, mountains, and valleys were all in white. It frequently happens that while one mountainous region is very wintry, another locality on the opposite side of the same mountains may be having mild weather. These conditions are often found along opposite sides of the Continental Divide; occasionally there is a storm on the eastern side and not on the western, and sometimes it is cold on the western side while there is warm sunshine on the eastern. But I enjoy all weather.

I stood looking westward at this steep, snowy slope down the very roof of the world. What a place to coast! I at once wished for a dozen other boys to try it with me. This would be the place for speed—steep places with long plunges —great rushes through the air. Hills and special toboggan slides would be gentle and tame compared with this steep, wild mountain side.

Wading out into the snow I sat down on my snowshoes and away we went, coasting toward Pacific sea level. Of course I exceeded the speed limit. The smooth slope dropped nearly a thousand feet in a half mile. Toward the bottom I struck the smoothest place of all. Here was a spring that had overflowed before the snow fell and coated the slope with almost smooth ice. Over this icy slope I went like a rocket. Near the bottom it flattened out abruptly and I was shot several feet into the air over a rainbow pathway—like a football kicked for a goal. At the highest point I looked down into the tops of timberline trees.

After twenty or thirty feet through the air I came back to earth and swept forward and downward at a hair-raising pace. One of the dwarfed little trees that barely stuck up through the snow caught into my snowshoe and hung on. The shoe was torn off and left hanging on the tree top, while I tumbled head over heels into four feet of snow. But this was the greatest coast I had ever had. I looked back up the slope along the mark I had made. It would be sundown in about two hours, and it would take about that long to climb up to the place where I had started to coast. But rescuing the snowshoe I climbed up the slope and slid off the roof of the world again.

It was dark when this coast ended. Pushing my sleeping bag into a loose snowdrift, I brushed the snow off myself and slipped into the bag, planning after a sleep to get up, make a fire, and have supper—of raisins—but I slept through the night.

It was not yet daylight when I awoke, but I concluded to have another royal coast. I again climbed the slope and down I rushed, landing several hundred feet to the north and a quarter of a mile below my night camp.

After getting my sleeping bag I went on down the slope where I found tracks of many kinds in the deep snow in the forest. There were stitch-like tracks of mice, big tracks of snowshoe rabbits, trails of squirrels to their supplies of winter cones under the snow, and tracks made by grouse, camp birds, and crested jays. I came upon the place where a mouse had peeped out of a hole in the snow and had been captured by an owl. At another place a coyote, after miles of zigzag wandering, had surprised and captured a grouse beneath a snow-covered bush. I crossed the tracks of a three-footed snowshoe rabbit followed by the tracks of a wildcat and wished I knew their story. But at last I came to the tracks of big animals—just what I was looking for.

In snowy regions the moose, deer, and elk have

winter ways which enable them to make a living and to outwit enemies. A number collect in a small area as the snow begins to deepen and keep the snow well trampled down so that they can walk on top of it. Crisscross trails and their connected trampled spaces enable the animals to run about, to retreat, to fight off their enemies, and to find something to eat. In autumn they eat the mosses and dry grass, as the snow deepens the twigs and leaves on the low-growing shrubbery—alder, willow, and birch—and as they trample the deepening snow and still keep on top of it they feed upon the low limbs of the aspen and other trees and spruce and hemlock needles.

I came upon the winter yard of thirty or forty deer—a trampled space of a half mile along the fish-hook course of a mountain stream. A stretch of trampled trail passed beneath arching willows. At one point there was a small, wet and spongy area on both sides of the stream where much of the snow had melted as it fell. Over this the deer had repeatedly trampled, eating the leaves and stalks of the blue Mertensia and other plants. These were still green, having been crushed down and preserved beneath the first snowfall.

One steep stretch of the stream was very swift and, together with the trampling in, it had not

frozen over. Here in the open water the deer had eaten all of the moss and water plants within reach. Near the point of the "yard" a snow-slide had come down from the long slope above, carrying off nearly all of the snow in its path and clearing a space about two hundred feet wide and several hundred feet long. Over this cleared space the deer had trampled, eating the exposed dead vegetation. In it they had often sunned themselves and lain down.

A deer yard full of animals is not to be seen every day. So I decided not to go farther but to have a look into every corner of this yard, and also to watch these big-eared, white-tailed fellows. If I wanted other excitement there was a deep, dark cañon near by that might be looked into. Near the yard I made a permanent camp. I built a fire in front of a cliff which soon melted the snow and made a little dry open place for my sleeping bag. I usually kept a fire going all night, rising two or three times to put on wood. Before getting into the sleeping bag I took off my shoes and put on a pair of moccasins, leaving all of my other clothes on. The canvas lining of my sleeping bag was removed each day and aired.

I ranged around this deer yard for two days. In walking through and around it I occasionally came close to the deer. They retreated without

great alarm, usually over several of the criss-crossing trails, to another part of the yard. Lion tracks leading into the yard from the woods showed that a lion had sneaked upon the deer. But evidently he had been outwitted.

Climbing down into a deep, snowy cañon, a tree limb that I was clinging to broke and I tumbled forward. In falling I had a glimpse of a fresh bear track in the snow where I was to alight. I had been hoping to see a bear track but when I landed upon this one I did not know what to do with it. Quickly scrambling to my feet I looked all around but could see only a few yards off because of thick timber. Suddenly I heard a furry rustle behind. I turned quickly, stepped on a snowshoe, and took another header. A camp bird behind me gave a low call. Then I braced up.

A bear track at any time is exciting enough, but it is a hair-raising surprise to fall upon one in a cañon. From where I stood I could see that this fellow had reared up with forepaws against a tree limb and I suppose looked and listened. Closer to me the mixed-up tracks and a bunch of hair on a limb showed that he had been scratching his back. Moving slowly and softly from tree to tree I slipped forward. The tracks entered a regular trail deep in the snow where this bear had gone back and forth. I

followed this, cautiously, to the side of a dark wooded cañon where there was a bear den.

From the den the trail led up the side of a cañon, across a little opening in the forest, and then on top of a large crag. Here in the sunshine the bear could see in all directions. Apparently this bear had come forth from his den a number of times and made his way to this crag to enjoy a sun bath.

Nearly all bears hibernate. Grizzly bears in the Rockies near my home hibernate from three to five months. I have found their dens in the side of a cañon beneath the roots of a tree, beneath a number of fallen logs, or in a little tunnel in a gravelly mountain side; and a few times I have found dens beneath a regular haystack of limbs, trash, grass, and bark which the bear piled up and then crawled into. With his stomach empty, about the first of December, the bear crawls into his den and goes to sleep. He appears not to eat or drink anything until the next spring. But grizzly bears, and perhaps other bears, occasionally come forth toward spring for an airing or for exercise.

I started to return to my camp by the cliff, but on the way I encountered another fresh grizzly bear track. I back-tracked this, planning to examine his abandoned den. But it was close to night when I arrived, and as I was

several miles from camp I thought to spend the night in the den. The gravelly floor was perfectly clean except for a few bits of dried skin off his feet and some hair, but the den was too smelly. So out I went to spend the night in the open without my sleeping bag. A short distance from the den I found a cave-like place between large rocks. Cutting a number of small tree limbs I stuffed these into the larger openings between rocks and shut off the wind in that direction. Then using a snowshoe I scooped out the snow and started a small fire burning all over the floor of the cave to warm and dry it.

I was in the edge of a forest of fire-killed trees and there was plenty of wood. Although it was rather snowy handling I gathered a quantity. I laid down three short logs in front of the opening, across these laid smaller ones, and on top of these piled still smaller ones, with kindling at the top.

Pushing the small fire to the front I set fire to this big pile at the top so that it would burn slowly. On the fire-warmed ground I slept three hours without wakening. Then the fire had pretty well burned down; my thermometer said it was ten below zero. But there was no air stirring and the night was surprisingly calm. Throwing on more wood I had another sleep. On awakening I started to trail the bear.

I did not have a gun, but the wilds are one of

the safest places in the world without one. Bears attempt to kill only those who attempt to kill them, and I hadn't any notion of trying this. What I was doing in the way of camping any boy could do, and it wouldn't cost much, either. My equipment was not at all expensive. About all there was to it was the sleeping bag and the snowshoes. Of course I always carried a camera.

Trailing this bear took me within a quarter of a mile of my camp. So I got my sleeping bag, thinking to be better prepared for the next night in case I trailed the bear far away. After wandering about in the woods for some miles the bear struck straight for the top of the Continental Divide. At two o'clock in the afternoon I followed his tracks over the top and started down the eastern slope. We then were at least fifteen miles from his former den. On reaching timberline on the eastern side he started along the mountain side as though going to a definite place, so I walked slowly, keeping a sharp lookout for him. At last, looking with my field glass, I saw him sitting in the sunshine by a hole which evidently was the entrance to an old den.

After watching him for some time he rolled over in the snow, rubbed his back, then went into the hole. Apparently he had become tired of his former den or for some other cause had

made a change. Probably he had used this second den before.

Although I had planned to call on settlers on the western slope, I found that a bear had led me half way home. I had not seen a single person or passed even a deserted house.

My days for this vacation were numbered and as I was now on the eastern side of the Divide, I started homeward over the twenty-mile stretch to my cabin. The coyotes yelped merrily under the stars. I could readily see to travel at night. At about one o'clock in the morning I threw my sleeping bag on the floor of my cabin.

CHAPTER II

HUNTING FOR THE ANIMALS OF PAST AGES

YEARS ago I arrived in a camp on the John Day River, Oregon, where a party of scientists were digging out fossils—the mineralized bones of prehistoric animals. Two geologists were examining a fragment of a sabre-toothed tiger that had just been brought in. When I told the scientist in charge of my desire to see prehistoric animals, he replied that he would be only too glad to have me stay in camp and explore the surrounding country for fossils. This was exactly what I wanted to do.

The following morning, feeling like a mighty hunter, I set off, armed with only a pick, to hunt for the giants of old. Two miles or so from camp I began climbing the steep north wall of the cañon, having been told to look for "sign" in the walls of every cañon. I knew something of trailing horses and had tracked and trailed wild animals with a kodak, but hunting for extinct otters, beavers, elephants, and wild dogs proved just as exciting. The prehistoric life in this region had lived in what geologists call

the Oligocene Epoch, three or four million years ago.

High up on the side of the cañon wall I looked down into the tops of the tall spruces growing near the river. The water was foaming and roaring through bouldery rapids. Numbers of ravens flew about or sat black and solemn on rock points at the top of the cañon.

In places the ashen rock was crumbly, the cañon ledges narrow, and parts of the wall nearly perpendicular. My previous Rocky Mountain climbing experiences were now useful. Little by little I explored half a mile along the face of the wall. This brought me close to the skyline. The wall above me was perpendicular and if I could climb upon that yellowish out-jutting rock I could then reach the rim and pull myself to the top. As the out-jutting rock was large enough to support an elephant, and as it showed no crack, I climbed carefully upon it. But as I straightened up and was balancing on it the thing broke off.

My pick was fastened on my back but it loosened, dropped, and glanced from a rock far out into space. I saw it as I fell away. But I struck several feet below in a collection of volcanic ashes and gravel, then rolled and slid thirty feet farther before I could stop. Quarts of sand and ashes had gone down my open shirt

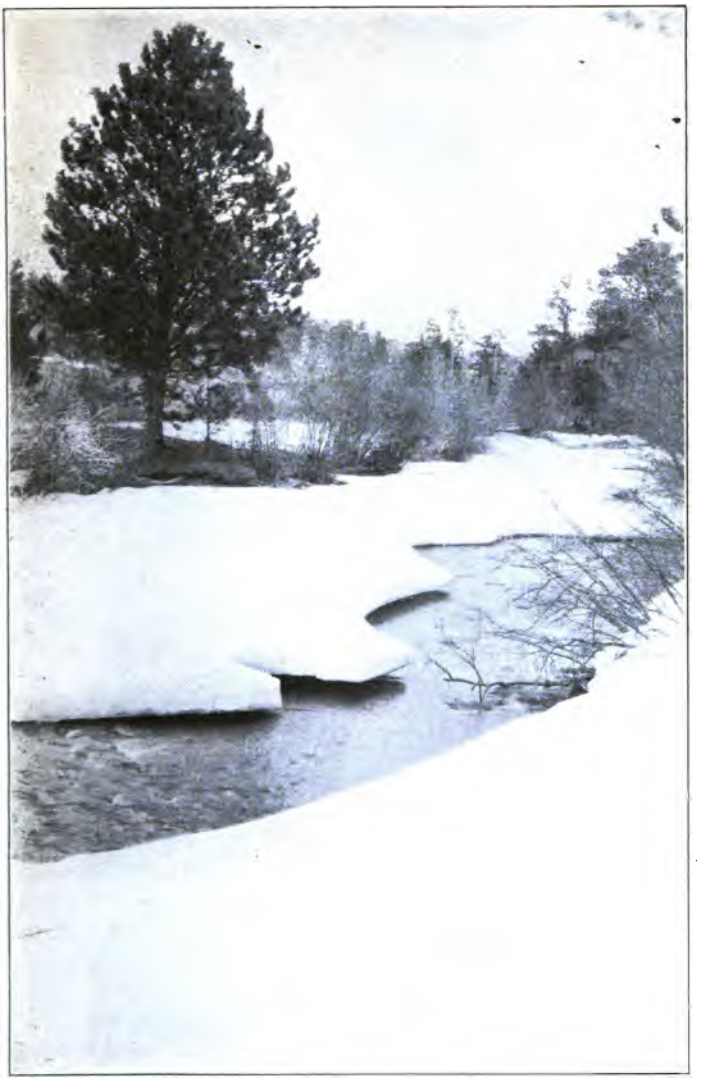


Photo by Enos A. Mills

The spring break-up

U. S. Geological Survey

An old sea bottom. Rocks carry fossils uncovered by ages of erosion. Smokestack Rock, Nebraska

collar. I stripped and did dry cleaning before going down to the river for my pick. My left thumb was swollen to twice its usual size, and there was a noticeable bump on my forehead. But I was a fossil hunter.

While shaking out the gravel I was attracted by a piece of the rock that had broken from the cañon wall and given me the tumble. I picked up the small, brittle fragment. It was a fossil. Most fossils are brittle, and during the weeks of cliff climbing that followed I saw many fossils projecting from the walls but did not use them for steep rock climbing.

After using my pick for about two hours the broken rock proved to be a nest of fossils. This was in easily worked volcanic ashen material, and in my excitement I forgot lunch and all about going to the top, and not until near sundown did I notice the time. It was after dark when I reached camp carrying one of the fossils. This so interested the scientist that the following morning he went out with me. When we arrived at the fossil nest in the cañon wall he promptly sent me to camp for two men. Then under his supervision we dug out the entire pile of fossils.

That evening, with everyone seated around the camp-fire, he arose to announce my find, as was his way with each new discovery. The men

had been joking me concerning the queer animals I might discover, but as this was my first evening to hear announcements I felt certain that I had made an extraordinary find. In the sudden hush before the scientist began speaking, I wondered if the larger fossils might not be those of an elephant.

"The beast found yesterday by the Kid is the first of the species to be discovered by our party. It is a Giant Pig."

Laughter and cheers greeted this statement.

"Look out, Kid, you may meet a bigger one tomorrow," called the cook.

"This one," continued the scientist, "is large enough; he will measure about six feet high, and he resembles an Arkansas razor-back."

This party, including myself, numbered eight. There was not a grouch in the party; the cook, and in fact each man, was not only good-natured but did much jollying. I suppose I was the storm centre of most jokes and it was impossible to guess when a storm was coming; it simply came—and often.

Our camp, of six white tents, was within an easy stone's throw of the river. Tall scattered spruces stood about us and the cañon walls rose steeply and high into the sky. One of the tents was dining room, cook room, and home for the cook. One was used for storeroom for both

supplies and fossils, and the others for sleeping quarters. I did not care for a tent, so slept out under an overhanging rock by the north cañon wall. We were perhaps sixty miles south of the Columbia River and about fifty miles southwest of Mount Hood.

The Fire Mountains, as the Indians called volcanoes, had long, long ago covered the region with thousands of feet of ashes and lava. Mount Hood, Mount Mazama—the wrecked remnant of which now is Crater Lake—Mount Shasta, and other volcanoes with ash showers repeated at long intervals, covered thousands of square miles deeply. For ages, between these showers, trees grew in the ashen region, and thousands of prehistoric animals roamed over it. Then these showers, or the wind, buried both trees and animals, and their skeletons were changed to fossils. The layers of ashes, due to their own weight and natural cement, were changed into stone; and water and the chemicals in the ashes changed the bones also into a kind of stone—into fossils. Where not crushed or broken these bones, though stone, still look much like old bones.

These geologic changes took place two million or more years ago. More recently the entire region was capped with a lava flow more than a thousand feet thick. This is one of the largest

lava flows known to geological history. During the ages that have followed, rain and river have been steadily washing off the surface and cutting channels and cañons down into this plateau. Many rivers, especially the John Day, cut down into fossil deposits. Numbers of fossils were washed away, but others, uncovered by the river, were in places to be seen sticking in the walls of the cañon.

Dozens of different species of animals left their fossils in this old ashen rock. Among these were tiny, ancient horses. At one time thousands of tiny horses, hardly knee high to a man, roamed over Oregon. One evening by the campfire which was between the cook's tent and the river, one of the men asked what I wanted to find. "A horse," was my answer. Everyone laughed loudly when the scientist asked if it was the Chalicothere model.

The scientist continued, "The Chalicothere, now extinct, appears to have been about the size of a modern horse, with a body of a horse, head and neck giraffe-like, but feet with claws somewhat resembling those of a bear." "That's a good circus model," called the cook. "Are you certain that there is an open season on him?" I asked. An excited hunter, I set off the following morning with my pick to look for a Chalicothere in one of the smaller distant cañons

in the top of the plateau. "If I get one I shall want you to come out with your kodak and take my picture with him, so as to follow the fashion of hunters who take prizes," I told the cook.

Each man had in mind some one fossil animal which he was eager to find and several other fossils which he would have been just as much pleased to discover. Among the animals in which the men expressed interest while chatting around the camp-fire were horses, tigers, beavers, otters, rhinoceroses, titanotheres, wild dogs, wild hogs, badgers, tapirs, squirrels, skunks, rabbits.

These and other species had left their fossils in this old Oregon plateau.

Apparently where these animals had lived was plains region and covered with more or less open growths of trees and possibly bushes. Fossil trees, "petrified forests," have been found. These consisted of broken, fallen logs, a number of them charred, and stumps still rooted where they grew. Among the kinds of fossil trees are redwood, walnut, sycamore, alder, cherry-birch, willow, pine, poplar, sumac, and magnolia.

A mild, warm climate appears to have prevailed. The only kinds of stumps that we uncovered, as I recall, were redwood—like the present California redwood—willow, and a magnolia somewhat like that now found in the southern states.

These John Day fossil beds are world famous and fossils from the region are now gathered in many museums and in several private collections. Numbers of these fossil animals may be classed almost as monstrosities—a mixture of two or more species of animals. The Chalicothere, for instance, appears to have been made up of parts now seen in three or more species. The Australian duck-bill, an egg-laying animal with body of an otter and bill of a duck, is one of the few present species that still have a mixed make-up. It is a living fossil. But in the ages that followed the Oligocene there were changes of climate, and grass and other kinds of new food developed, and these caused changes in the animal life. The John Day species lived in an epoch when modern forms were being developed but had not yet taken a distinct form. Numbers of species of geologic animals became extinct long ago. But all our present species of animals are descendants of geologic species which did not become extinct but which changed from age to age and finally took on the modern model.

"Has any one found a deer horn among the fossils?" I one day asked.

"No; during the Oligocene times the true deer had not yet developed, and none I think then had horns," answered one of the geologists. "A little later a deer did exist and he had four

horns; two on top of the head and two just above the nose. He had teeth somewhat like those of a dog."

This sounded like one of the strange stories so often told for my benefit, but the geologist went on to say:

"Many of the strange animal species of Oligocene times changed slowly through the ages which followed, and more and more became like the animals which we have to-day. While the Oligocene horse and wild dog and beaver and numbers of other animals but little resemble our horses, dogs, and beavers of to-day, they were after all the ancient ancestors of those now living, and in fossils of animals who lived between the Oligocene Period and the present we find forms that show a series of changes through which they advanced from the peculiar forms of the Oligocene to the specialized forms of to-day."

Another animal which the men were ever warning me to "watch out for" was one which had hoofs like a cow and that climbed trees like a cat. A queer, though small, animal of this type did once live.

"In the Oligocene times," said one of the geologists to me one evening, "lived an animal with a five-jointed name who might have been a weather prophet. He was not unlike a ground-hog and lived in a den; but he had horns on his head."

"There ain't no such animal," I replied. But there was in one age just such a beast.

All one day the scientist was out with me. We climbed to the top of the plateau and went to a dry cañon about twelve miles from camp. On the way over I asked him if all fossils were formed beneath volcanic ashes. He replied that many were formed beneath wind-blown sand, a few in caves, numbers in fissures or cracks that earthquakes make in every kind of surface rock, and now and then an animal sank into a bog, swamp, or quicksand and became a fossil. There are many ways and places in which animals or plants change to fossils but the most common place is in the mud bottom of a lake or the seashore. Perhaps the majority of fossils are formed in the mud of river deltas below water level. The water in circulating removes the animal or vegetable matter of remains buried below water level and deposits mineral matter in its place. Most fossils thus are mineralized stone. Rarely is any of the original animal or plant preserved.

He went on to say that any record left by the life of other ages is a fossil. The impression of a leaf, so often seen on sandstone, a mould left after a buried body decays, a track made in mud, later turned to stone, are fossils. Among the other things not often thought of as being fossils are amber and coal.

The older fossils are countless millions of years old and numbers of fossils for each of the past ages have been found.

There are hundreds of fossil beds on earth. There are dozens in Oregon, and, I think, one at least in each state in the Union. Fossil horses are found in perhaps eight or ten of the western states.

In the wall near the bottom of the dry cañon which we visited the scientist showed me a small, filled-in gully. This gully had been made in an old surface by running water ages ago. This present cover of ashes fell and filled it. He said there are hundreds of these filled-in or buried gullies and cañons.

We did not find a single fossil. But he said that the cañon was a promising one to prospect and that later he would ask me to show it to one of the geologists. On the way back to camp we saw four flocks of antelope and several times during the day we saw coyotes.

That evening by the camp-fire the scientist said: "During my absence to-day someone brought in an excellent fossil horse. He has three toes on each foot with the middle toe most developed. His strange teeth are for the eating of twigs and bark; grass had not developed when he lived on earth. If fat he would have been the size of a small sheep. An epoch after his

time, in what is called the Miocene, grass for the first time grew and the teeth of horses later changed to grass-eating teeth such as horses now have."

That evening I talked about prehistoric horses with one of the geologists until everyone else had turned in. Then early the following morning I climbed along cañon walls hoping to see the fossil of a tiny Oligocene horse sticking out of the rocks.

The oldest discovered fossil of the horse belongs to the Eocene Epoch, perhaps four million years ago. He is known as Eohippus or Dawn Horse. At that time he was not more than a foot high, had four toes and a rudimentary fifth one on each foot. Someone wrote of him:

> Said little Eohippus,
> "I am going to be a horse,
> And on my middle finger-nail
> I'll run my earthly course."

By the following epoch, the Oligocene, he had grown to the height of two feet and had reduced the number of toes to three. During the next epoch, the Miocene, the Great Plains region of the West was uplifted and became a vast, grassy prairie. The horse, evidently benefited by grass, changed and developed rapidly. His legs lengthened, he at last came to his middle finger-nail—one toe;

his brain also developed. The horse is a story of evolution—of progressive change. The horse, when the Ice Age appeared, numbered at least ten species, one of which was larger than any present horse. Though numbering millions the horse completely vanished in America during the Ice Age. No one has yet determined the cause of the extinction. Our American horses are descendants of the Arabian horses brought to Mexico by the Spaniards.

Though I had many a happy search and persuaded the men to examine numerous fossils in steep-walled cliffs, a little Miohippus was not discovered. The cook urged me to buy a Shetland, though this was far larger than Miohippus, as he thought this and my giant razor-back would make a good start for a circus parade.

One day I found promising fossils about ten miles from camp, but it was so far away that several days elapsed before the scientist could ride over to examine. One morning he and two geologists took tools for the careful work of getting the fossil out of its place in solid though not hard rock. We used pick and shovel in cleaning off the rock over the fossil and after this the geologists used chisels, hammers, and small pointed gouges and finally awls and brushes. The idea was to free the fossil without cracking or losing any of it. Often days are required in

taking small fossils from hard rock. Two days were spent in getting out the eleven small bones of this find.

"The boy has made another good find and if he continues making discoveries he will early be able to have a circus parade of strange animals which the cook keeps planning." At this point a dash of wind filled the scientist's face with smoke and ashes from the camp-fire.

"Don't let that specimen be lost beneath another ash shower," called the cook.

There came another swirl of wind throwing ashes, shadows, and fire light against the standing spruces, and the scientist sat down but continued with "The boy has found a prize that Barnum would have turned into a fortune. It is a tiny camel—about three feet high."

Amid the shouts and laughter someone called, "There ain't no such animal."

"Camels," continued the scientist, "originated and developed in America. During the Miocene Epoch, when America, Asia, and Europe were broadly connected in the north by the so-called land bridges, thousands of camels and horses appear to have become travellers and migrated to Europe and Asia where they concluded to stay. While the camels and American horses were going to those countries, America was receiving the rhinoceros and numbers of other

species of mammal immigrants. My boy," he said, turning to me, "if you will keep on exploring you will find hundreds of other exciting facts in fossils, both afield and in books."

One day the cook, in fishing about a quarter of a mile below camp, discovered a fossil which turned out to be a part of Miohippus, the little Oligocene horse. In joking him concerning his horse he offered to give it to me if I would find a Chalicothere. He suddenly asked, "What would you feed a Chalicothere? Giraffe, horse, or bear feed, or would you mix these and make him a prehistoric hash?"

I often puzzled over how it was possible to tell the age in which any fossil animal had lived. There were perhaps one hundred past ages of prehistoric life. Fossils of animals from fifty thousand years ago had been found, and fossils perhaps millions and more likely a billion or more years old had been discovered.

One evening a number of us planned to get the scientist to talk at the camp-fire about fossils and the different ages, chiefly for the benefit of the cook and myself.

"Fossils," he said, "are known somewhat after the manner of clothes. Each year or period has its particular cut. Most fossils are found in sedimentary rocks—limestones, sandstones, conglomerates, and schists. During the

long past of the earth the wash of running water —rivers—deposited deltas in the sea and in lakes made sedimentary deposits. The delta material changed in the sea to rock. These rocks, if placed layer or strata upon one another, would be forty miles thick. The lower fifteen miles were deposited before any life was upon the earth. These lower are without fossils. From, say, the sixteenth mile to the top where we now are, there are fossils in each layer. Suppose we divide these twenty-five miles of layers into one hundred stages of life. The bottom which holds the few oldest fossils we will number One, and the top stage where we are we will call number One Hundred.

"The advanced and peculiar stage of development shown in these animals of the Oligocene would, I think, justify their having number Ninety-five. Untold millions, and perhaps billions of years and countless influences had slowly shaped them into what they were.

"There were but few kinds of fossils in the remote times of number One. These were of small, crude, though simple pattern. Having seen one of this pattern it would never be confused with the pattern or model of number Ten or some later times. In a way the fossil model of each age is as distinct and peculiar as that living fossil the Australian duck-bill. The dis-

tinct lines of the models of each age clearly fix it, with those who know fossils, as belonging to a definite age, even though not branded with the number of that age.

"In number Two layer the fossils show an increase in number and an improvement in pattern. With a little study one would remember where these peculiar fellows belong, even though number Two is not branded on them.

"Numbers of animals died before the close of the age in which they appeared. Those that through their descendants lived on into the next age showed evolutionary change—improvement —over original appearance. Occasionally, too, in a layer was an entirely new fossil. By the time layer number Fifty is reached the fossils show multiplied kinds and marked improvements in every vital point and have a much better appearance than those in numbers One and Two."

All life progressed with age. And as one examines the fossils in the layers closer and closer to the top, the fossil life shows speedier forms, better teeth, and larger brains. In the layers or ages immediately preceding the one in which we live many kinds of life have the form of to-day; and other kinds, in fact nearly all the birds, flowers, and animals, have long been nearly as they are to-day.

Often in my rambles I have spent a day or several days in the camp of fossil hunters. My last experience was in Texas where the geologists were digging fossils of an animal that had been able to live either in the sea or on the land. But I ever recall with satisfaction the scientist, the cook, and five other real men who made life worth living while we searched for fossils in the cañons near where rolls the Oregon.

CHAPTER III

CELEBRATING GROUND-HOG DAY

A BEAR'S track in the first autumn snow! This was a sure sign, Old Jim said, of a mild winter. Yet Old Jim had just been telling me that all the signs said the coming winter was to be a cold, snowy one; the geese had raced south early, squirrels had been gathering cones late into the night, beaver fur was the heaviest ever seen, several kinds of birds would soon be wearing feathers enough for a pillow—all these were preparations for a long and cold winter. On February second the ground-hog was sure to look forth on snowy distances, see his shadow, and then retreat to the bottom of his den, for winter was scheduled to last still six weeks longer. Off I went to try to discover if other bears were making the mistake of contradicting famous weather signs. Either this bear did not know what he was about, or else the hard winter signs were not correct.

Bears hibernate every winter. But if they are still about and making tracks in the first snow this is a certain sign that winter will be slow in

arriving and that, of course, they will be in no hurry about turning in. For two days I searched the mountains for bear tracks. The snow was dotted and splashed with tracks—deer, sheep, mice, and birds. A snowshoe rabbit made a track large enough for a lion; while a cottontail and a magpie left record of their misfortune, each had lost a foot. Late afternoon of the second day I found a fresh bear track and on the way home another—the track of a grizzly. Now a grizzly is one of the wisest fellows in the woods, and the fact that he had not heard that there was to be a long, cold winter was almost enough to cause me to doubt the signs said to have been made by many other wild people.

Old Jim had complete confidence in the weather wisdom of the ground-hog, as did everyone else whom I had ever heard mention him, so I quietly resolved to keep track of his doings and to pick up ground-hog information even though I neglected a number of good books which people had been kind enough to loan me. The ground-hog weather lore says that on February second this animal wakes from his hibernating sleep and comes out of the den. If he sees his shadow on the snow there will be six weeks more of winter; if he does not see his shadow winter is practically over.

Every near-by ground-hog den was located.

Only one track was found. Ground-hogs commonly are hog fat by late August and den up by mid-September. With the first coloured leaf that autumn flutters they make haste to dig a new, clean den in which to sleep until the first flower of spring.

In looking up Ground-hog Day I learned that it was also Candlemas Day and read,

> Observe which way the hedgehog builds her nest,
> If by some secret art the hedgehog knows,
> So long before, the way in which the winds will blow,
> She has an art which many a person lacks
> That thinks himself fit to make our almanacks.

I thought that Ground-hog Day would never come. Winter, as Old Jim had said it would be, had been cold and snowy. If the ground-hog saw his shadow February second he would return for a sleep while winter lasted six weeks longer. But if it was a cloudy day spring must be near; in a day or two the ground-hog would be hunting for the sunny side of a cliff to find the first green salad on which to break his long fast.

February second I was out before daylight. But the morning was cloudy and unless there was a clearing the ground-hog could not see his shadow. The predictions for six weeks more of winter might be overthrown, that is, they

might be if the ground-hog sign was correct—and everybody had said it was. I started off as soon as I could see. There were fourteen ground-hog dens to be visited. I wanted to know if ground-hogs came out on this day and if they did I wanted to see at least one.

The first animal I saw was a rabbit. He sat up straight, in fact he almost stood up. When rabbits sit up straight it is a sure sign, so I had heard, of cold weather. Surely the sky would clear so that the ground-hogs could see their shadows!

I nearly wore out a pair of boots rushing from ground-hog den to den. Dark, low-drifting clouds filled all the mountain valley. It did not look hopeful for sunshine and ground-hog shadows. But shadow or no shadow I wanted to see a ground-hog show his head from the entrance to his den. The highest den visited was one far up the mountain side which I hoped might be above the clouds and in the sunshine. Its snow-filled entrance holes showed that the weather-maker had not even looked out. February second had been cloudy from morning to night. I had not seen a ground-hog. What would the remainder of the winter be? That night I went to sleep while repeating:

> If Candlemas be bright and clear
> We'll have two winters in the year.

Winter ended early; it was not a long or a severe winter after all. The bear was correct, and so, too, was the ground-hog; that is, if they had anything to do with weather predicting and arranging. But the birds, squirrels, and beavers who had made such extensive winter preparations had made a mistake. But did human weather prophets understand the plans and preparations of any of these wild people?

Down the mountains I walked fifteen miles for a visit with another boy. We talked over weather signs, planned to meet next Ground-hog Day, and above all to be alert and learn all we could about the ground-hog and other animal ways.

Squirrels commenced gathering pine cones for winter as early as the cones were ready—the last week in July. These cones were piled by stumps, logs, and tree roots and in hollow logs in small nests. The nests or little holes were about the size of a robin's nest dug into the leaf and trash coverings of the forest floor. Each nest had from five to ten or sometimes twenty cones, and these cones were never more than two deep. All the cone piles of each squirrel were within a space ten feet square and within thirty feet of the tree in which the squirrel had his winter home.

One squirrel had stored one hundred and fifty-

four lodge-pole pine cones; another, one hundred and sixteen yellow pine cones; a third, two hundred and fifty-seven spruce cones; and still another, more than four hundred assorted pine and spruce cones. Each had gathered the cones that were closest to his home. During the preceding autumn these same squirrels had gathered nearly the same number of cones, had stored them in the same spaces as this year, and had arranged them in almost the same manner. As more cones were gathered each year than were used I saw no way safely to predict the weather from information which squirrel harvests furnished.

One afternoon George came riding up on horseback. He left his pony standing and hurried over to me faster than I was rushing to meet him. He had the startling news that a big ground-hog had just made a den by one corner of their garden. His grandmother was certain that this was a sign for a cold winter. Whenever animals and birds come to live close to your house a cold winter is not far off. This was something new in ground-hog lore and I heard it with startled interest.

I could not just make out if there might be some other reason for the ground-hog's den at that place. I figured that this must be a wise ground-hog. And he was. Before the summer

was half over he was the fattest ground-hog in the region. He had eaten everything in that corner of the garden closest to him.

During the summer I dug into a number of ground-hog dens. All but one were more than four feet beneath the surface. Each den was about two feet across and more than a foot high. The den was reached by one or more tunnels from the surface. Two of these dens reminded me of a big, four-legged spider; the body was the den and each leg a tunnel to a different place in the surface.

In digging into these dens I must have moved tons of earth and rocks. One day a prospector asked me if I was after gold. He looked at a number of pieces of mineralized quartz which I had dug out and told me of an experience with ground-hogs. He had found a mine by following up a piece of gold quartz which a ground-hog had dug out.

When I asked him about Ground-hog Day he laughed and said that it was a superstition based on the assumption that the ground-hog does come out of his den February second. "But," he said, "there is not a record that he comes out, and I have not been able to find any one who has seen him on this particular day. I have repeatedly watched for ground-hogs February second, but without seeing them or finding

any record, in snow-filled entrance holes to their dens, of their coming out. A ground-hog, a bear, or any hibernating animal may come out on this day or any day, but this has not the slightest influence on the weather." Before going on with his pack burro the prospector took a piece of charcoal and on the white bark of an aspen showed me how to make drawings of the dens which I dug into.

Where conditions—food and digging—are favourable there sometimes are numbers of dens in a comparatively small area. Conditions must be favourable for the making of a den. Often the den is by an outcropping rock ledge, preferably in gravelly soil. Sometimes along the side of a rock and in fractures of it there is opportunity to dig down. Other dens are by and beneath boulder piles or beneath the roots of big trees. In any case the ground-hog desires a background—some place where he can lie in the sun and feel secure.

Ground-hogs become so hog fat that they make a comical show with tail flopping as they go on hasty, short gallops for the den. A ground-hog has a heavy body and short legs and at best is a low-geared animal. Having enemies he generally keeps close to the den.

There are exceptional cases where old ground-hogs do wander far away. Two summers while

I was guiding on Long's Peak a ground-hog had located on the summit. A few minutes after I arrived on top with a party of climbers he would show himself and wait for lunch scraps. After he was better acquainted he did not wait but expected to have helpings from the first table. His winter den was two thousand feet below the top. Ground-hogs, especially in spring, search for the first green plants; judging from their tracks, they know just where these are most likely to be found.

I tried to weigh a big ground-hog near my cabin. While he was out I plugged entrance holes then got him into a sack. He was a fat pig and weighed I know not how much more than the twenty-four-pound limit of the scales. He was yellow-brown over back and sides with an orange-coloured belly, cheeks nearly white, paws black, and forehead nearly black, his ten-inch tail covered with hair from four to six inches long. This tail was like a big dust-brush. This fellow and numbers of others became half tame and would come close for turnips and other things which I carried to them.

Many times I have seen four youngsters around a den. Often they were asleep in the sun, and other times chasing one another around a stump or having a game of tag over the rocks. Several times in August I found young hogs

alone each digging a den for himself. I do not know if they left home, or if mother sent them away.

The ground-hog hibernates, but the prairie-dog, closely related to him, usually does not. In watching the ground-hog one day I noticed that two kinds of chipmunks hibernated and that bumblebees were also hibernaters. It was fun to examine a nest in which the bees were having a peace sleep with stings not working. There was no need of a fellow running and striking after making a friendly call, which bees so often pretend to understand is not friendly.

Ground-hogs are found in a majority of states in the Union. They are also called wood-chuck, rock-chuck, chucker, and marmot. If their home is close to a garden or a grain field they are likely to be unpopular with the owner because of too many raids on those things which the owner wants for himself. They are sometimes dug out by wolves, foxes, and even by bears. I often wondered how all this weather lore was given to the ground-hog.

The second autumn I still half believed in signs and wandered looking for bear tracks and everything that was supposed to reveal advance weather secrets. A number of hunters and trappers and also other people were asked how to tell for certain that birds and beavers were

wearing thicker or thinner coats than usual; but no one appeared to know any certain way.

I dropped these signs and investigated beaver colonies. One beaver colony began work extra early, but as they were building a new house they naturally began work earlier than other colonies. One colony cut and piled in the pond two hundred and ninety-three aspens for winter food; another colony, just one minute's walk up stream, harvested only sixty-eight. The dams that were repaired appeared to need repairs; those not touched did not need attention. In trying to see how to predict weather from beaver work I got a headache. Each beaver colony appeared to have its own way of doing things or else each was doing what it needed to do. The big harvest may have been for a colony with many beavers and the small harvest for a few beavers. I do not believe the beavers did any guessing about the winter. They were prepared for any weather. The beaver is an animal with unusually interesting ways. Many of his customs are not well known. It is said that if he lays up more supplies than usual, or grows thicker fur than usual, the winter will be colder than usual. But any boy who has had the fun of watching a beaver colony in autumn will realize that the beaver prepares at the beginning of autumn for a real winter every year.

Most ground-hogs were not seen after early September. Many of those around me dug a new den. A number who had summer dens out in the meadow by rock piles moved back into the woods. The entrance ways to dens in which hogs were hibernating appeared to be partly plugged a foot or two beneath the surface. There was no plan that I could see for coming out on Ground-hog Day. Each winter den examined had a short tunnel which led off into the gravel and in the end of this tunnel there was buried excrement. Evidently when a woodchuck enters his den for the winter he plans to stay inside until spring.

Two nights in advance of Ground-hog Day I arrived down the mountain at the home of my friend George. I wanted to be on time. George was still strong for signs and all this mysterious weather lore. After I had related a number of my observations and facts I had read or heard, he continued to believe but he wanted to see what might be discovered.

Ground-hog morning was absolutely clear. There was five inches of snow; we wanted snow because there was a dispute among the prophets as to whether the shadow of the ground-hog would count if not seen on the snow. We were two miles from the house when the sun came up. We wondered if ground-hogs were early risers

as we shivered nearly frozen in a place where we were close to three dens. Nothing showed up, so we moved on. These entrance-ways to the dens were partly full of untracked snow. We planned to return later in the day and see if anything had made a footprint in the snow.

Hours were spent crawling and looking. Not a ground-hog nor even little pig children were seen. In going across an opening we saw a line of tracks reaching from a den into the woods. While I was looking into the woods George, all excitement, grabbed my arm and pointed at a brown head poked forth from the hole and making a shadow on the snow.

Then this shadow maker climbed out and hurried off in a crippling gallop. It was a three-legged coyote. When one goes out looking for something he is certain to see something of interest even though this is not a ground-hog shadow on the snow. Two of the surprises I had in wandering the wilds hunting with a kodak were that frequently animals are crippled and that they so often play.

Late afternoon we returned to the first dens watched in the morning. The snow in the entrance-ways was still untracked. Our shadows showed upon the snow—where ground-hog had not shadowed. But the shadow of a big peak to the west would soon slip across the den and it

would then be too late this year for a ground-hog shadow to produce six weeks of snow and cold. We had almost lost faith in all forecasting weather signs. What was the use bothering about signs that at best did not agree? We could not change the oncoming weather, and we could have fun outdoors in all kinds of weather.

We started for the house and on the way we talked about a number of catchy but unreliable weather signs—signs that we knew had not made good in the mountains. Among these were:

Rainbow in the morning,
The sailor takes warning.
Rainbow at night
The sailor's delight.

If March come in like a lion it will go out like a lamb. If it come in like a lamb it will go out like a lion.

Cold weather comes quickly and warm weather comes slowly.

George said that he remembered once when a hot day had come quickly in winter. One cold morning he went out for a look at the thermometer before breakfast. It was twelve below zero. But he could hear a wind-storm coming out of

the west. It was the Chinook wind—a warm, dry wind which melts snow quickly and carries the moisture off on the wind without ever wetting the earth. The Indians call it the "snow eater." George had breakfast and did a few chores, then had another look at the thermometer. It was up to forty-one and the snow was rapidly melting.

I then told him of a night I had had camping out in an old cabin. I was cold in my sleeping bag in the early evening. During the night I had got so warm that I thought the cabin was on fire. But it was just a Chinook. At five o'clock in the evening there had been seven inches of snow over the earth. At six the following morning it was gone and the ground bare and dry.

Near the house George and I were overtaken by a man on horseback. During the day's ride he had seen coyotes, prairie dogs, deer, and mountain sheep; but not a ground-hog. He had ridden up from the plains where it had been snowing all day. So several miles away the ground-hogs could not see their shadow while those up here could have seen theirs if they had cared to look.

What kind of weather would we have during the next six weeks? Would it be determined by the ground-hogs of the plains or by those in the mountains? What kind of weather would

result if there was sunshine in New York and cloudy weather in Pennsylvania on the same Ground-hog Day? If——. We gave it up.

The ground-hog in common with other animals has lived upon the earth for countless ages, perhaps about three million years, so geologists say. Long before he had been heard of there were both weather and climate over this good old world of ours. There had been Ice Ages and world-wide climate so balmy that palm trees had grown in the Far North—not far from the Pole.

However, there are a few weather signs, or more correctly indications, that are closely allied to woodcraft. Through them one can usually tell in advance when there is to be a change in the weather. Among these indications are unusual gatherings of birds, listlessness of animals, smoke drifting down and around as though lost, and animals showing interest in a particular direction or collecting at a sheltered place. Often animals realize hours in advance that there is to be a change in the weather. Each human and animal is a delicate barometer which responds to air changes. Animals appear particularly sensitive and responsive to these changes.

The actions of mountain sheep have several times suggested to me that wind or snow-storm was coming. One cold morning I was crossing

Photo by Enos A. Mills

Aspen Beaver cuttings

Photo by Enos A. Mills

Long's Peak above a storm

the Continental Divide. On the skyline I saw a number of sheep pointing their noses into the west. Closer to me another flock walked directly to the plateau rim and pointed their noses into the west. There I left them standing. Early the following morning a Chinook came roaring out of the west. Another day three separate flocks were watching the northeast sky. Twenty-four hours later a blizzard arrived from the northeast. But there probably isn't anything in the make-up of animals that will give long-range weather information. These sheep simply had delicate advance wireless messages of what already was coming.

Just as George and I were parting at the house something stuck its brown head out of a hole beneath some bushes, then ducked back. Both thought it was a rabbit but it might be a ground-hog. We had lost faith in the weather business of ground-hogs but if one was loose on Ground-hog Day we wanted to be sure and have a look at him.

We made haste to try to rout the fellow out. George was prodding away at a lively rate in one entrance hole with a long, slender pole, while I was watching the other entrance and trimming another pole with which to explore in case George failed to start anything.

"I'm prodding something," called George,

"it feels like a fat pig." He pulled out the pole and looked at the end to see what kind of hair might be sticking to it. Then he went to poling again. I lay down with my ear close to my entrance hole. There was a clawing inside, and excited, I called, "He's coming out!"

George came on the jump, pole in hand, to see what HE was. Out rushed a badly frightened rabbit. It never occurred to us that there might be something behind this rabbit to give him such a fright. Out came a skunk! He was not at all frightened; but we were. Our poles fell as we jumped back. These fell on or by the skunk. This was too much. A "polecat" should never be pole-prodded. We moved quickly, but the skunk went into action so speedily that we were shelled with skunk gas.

CHAPTER IV

PIRATES IN THE MOUNTAINS

RETURNING to my camp after rambling all day in the mountains I found two men pitching a tent near by. They were discussing pirates and piracy. We were in an out-of-the-way region in eastern Kentucky. A few widely scattered, picturesque characters were the only settlers. There had been feuds, I knew. But pirates! Could it be that a few had left the sea and found refuge in these wild mountains?

"Over there," explained one man to the other, "was a remarkable case of piracy." He pointed to the wild section in which I had spent the morning alone. I postponed supper and stepped over to hear more of pirates.

"Young man, these mountains are infested with pirates," said the geologist. "To-morrow we are going out to see where a pirate recently captured and beheaded a river. Would you like to go along?" I would. These men were out studying erosion, geology, adventures of rivers and related subjects. During the evening

I heard that in other mountain regions in the United States pirates might still be seen.

I liked the names that this geologist used that evening in describing streams. They were scientifically correct names, too. He spoke of a "young" river and of another as being in slow "old age"; of an uplift that had steepened the grade and "revived" an old river; and mentioned the Potomac, the James, and other rivers as having been recently "drowned"—an extraordinary experience for a river I thought—by the seashore sinking and permanently lowering the mouths of these rivers below sea level. There was no end of discussion about streams eroding headward, cutting their way through a hill or even a mountain, and capturing the head of the stream on the other side. A river that loses its head is "beheaded"—by a "pirate." Rivers also dig in and entrench themselves.

Out we went next day, and the geologist showed me where a pirate river had sawed through a mountain and come out almost underneath the stream on the other side. This beheaded stream on the other side poured down into the new channel. Then we went to see where a pirate had recently captured an old pirate—who had a record of three beheadings.

A stream flowing down a hillside cuts a channel headward just as a saw cuts into a log. A

river is a liquid saw. The water is toothed with sharp sand and gravel and thus edged will saw its way into hard rock; and saw rapidly if the rock is not hard. If there is an uplift the steepened stream will cut more rapidly; if the land sinks and leaves the river with less grade it will cut less rapidly. The steeper the flow the larger and the more numerous the sharp-edged rocks—cutting tools—the water carries and thus the more rapidly it cuts. The stream that captures another must dig a deeper, lower channel than the one captured for the latter to pour into.

"Many a mountain river is older than the land around it," was one of the most interesting things that the geologist said. "It was there first, was in place when the present mountains began to be uplifted. Rivers have worn down and washed away two or more mountain ranges without losing their place. Every river is likely to have a long life with adventures all the year round. A mountain sometimes rises beneath a river, lifting the river up with it. Mountains have risen right across the channel of a river. The river generally cuts through. A mountain rises slowly, while a river cuts or erodes rapidly. It is an expert in cutting through rock ledges. If the mountain rises a thousand feet the river cuts a cañon a thousand feet deep. Generally by the time the mountain is uplifted the river has severed it."

Often a stream cuts or works along behind a rocky ridge as though keeping out of sight while hunting for an easy way through the hill. Many a time it does find a break and speedily cuts through.

I told the geologist I had been among the seven hills of Rome. He said these were of one watershed which had been cut in pieces by streams. He did not recall any piracy there. After a long day with him I crossed over into Virginia to have a look at a few water gaps.

Stream piracy is common. Only a few miles from my home a pirate did recent beheading. In several places I have seen where only a thin ridge separated the heads of two streams and each was digging away after the other with all its might. In rambling over the country I have frequently found that the present drainage system has largely been made by piracy of the past. Many of the big rivers of to-day have grown large by having been pirate river robbers in their early days. In camping on the headwaters of the Delaware and the Potomac rivers I found unusually interesting cases of piracy and beheadings. Originally these rivers were wholly on the front side of the Appalachian Mountains, but they found breaks, worked through and on the back side of the mountains, and captured the headwaters of I know not how many streams;

their headwaters still are on the back of these mountains.

The mighty Tennessee River is made up of the volume of three or more beheaded rivers. In recent geological times there were upheavals and subsidences of the earth in the mountains of the South, and streams seem to have dug to right and left and worked headward at a lively rate. In the river feud the Tennessee seems to have been the most successful one. Eastern Kentucky and Tennessee, western Virginia, West Virginia, and other states have many water gaps —former channels of streams which lost their heads and left these cañons without water.

Cumberland Gap, Virginia, has a good geological background and the story of river piracy in its history. It is a useful and much-used thoroughfare through a long and formidable mountain barrier. I suppose the deer, the black bears, and the Indians had trails through it long before the white man came to this continent.

The orator, Henry Clay, a man of vision, visited it that he might better give to his imagination pictures of the long and unending procession that was flowing through it. The pass for years was the route over which and through which the pioneers, trappers, explorers, and adventurers, thousands of them, flowed into the valleys and the mountains of the great West.

During the Civil War armies sought to have and to hold this gap. And to-day through this pass commerce and communication flow in both directions. It will endure for ages unless it be uplifted or sunken beyond its present place; and so long as it is where it is this useful open way will suggest the romantic pirate story that gave it a place in the sun.

I camped through the Yellowstone in 1891 and was out with a geologist who showed me records of pirates, glaciers, and volcanoes. The Continental Divide in Yellowstone did not look like I thought a continental divide should. It was low, nearly flat, mostly smooth, and forest covered. I crossed it several times without knowing that it was a divide. At two or three places there are "Two-Ocean Ponds"—shallow, water-filled depressions, each with two outlets, the water from the west end going to the Pacific Ocean and that from the east to the Atlantic.

The Yellowstone River did a lively piece of piracy in capturing not a river but Yellowstone Lake. In seizing the water of this lake the Yellowstone River cut through a rhyolite plateau and formed the glorious Yellowstone cañon. This brilliantly coloured cañon has in it one of the wildest of waterfalls. The Indians called this country the Top of the World. Yellowstone Lake, at an altitude of about 7,800 feet, is some-

thing like one hundred miles around and is said to be the largest lake in the world at so high an altitude. In capturing the lake, Yellowstone River, pirate thereby, captured all the streams emptying into the lake. This made a new geography lesson and an interesting pirate story. The waters of Yellowstone Lake before capture flowed through the Snake River to the Pacific, but now they go down the Yellowstone-Missouri-Mississippi to the Atlantic.

A Chilean river on the Pacific slope of South America worked headward and sawed through the Continental Divide. It beheaded a stream on the Atlantic slope and diverted its waters from the Atlantic to the Pacific. This nearly caused war between the Argentine Republic and Chili. The original Continental Divide was the boundary line between these nations, and this piece of piracy moved the boundary line and threw these two powers into angry confusion. After much searching and surveying the Continental Divide was found and a new boundary agreed upon. But in all probability this, too, will be moved, for rivers have never paid any attention to a divide or a national boundary line.

Thousands of hills have been entirely washed away by rivers, others have been partly removed, and many streams are to-day cutting away at watersheds and mountains. In many states of

the Union the state geologist may be able to tell in what region to look for pirates.

In placer and hydraulic mining enormous sections are washed from the mountain sides. This is done both by turning the high-pressure water from hoses against the earth and by carrying a quantity of water along ditch and flume, then flooding. This uncovers gold. But so enormous is the quantity of wreckage gravel and sand washed into stream channels that a number of states have laws on their statute books to regulate this kind of mining.

That pirate rivers and all other rivers were washing off the surface of the earth and carrying it away to the sea seems not until this time to have interested me.

But one evening while boating down the Missouri River the splash from a bank cave-in upset my boat and I took dry clothes and supper with a family who lived near by on the river side. I told the boy at this place that the Missouri had been a pirate. He was all excited, while I went on to say that most of the rain which falls on land runs back into the ocean through rivers. Here the water evaporates, forms clouds which sail back over the land as airships and pour down the rain so frequently that the rivers are kept going day and night.

Robert—Robert Peters—was older than I.

He said that the Missouri River appeared to be made up more of mud than water, and he thought it was a pirate not because it really wanted more water but land, more mud and sand. It captured other rivers incidentally in its hasty digging out and washing away of the countryside.

"Water and land are always fighting," he went on to say. "You can see this at the seashore. Each is ever trying for the area of the other. The sea would hardly be sending water up in the air and across country in cloud ships, then back to the sea in rivers just for the fun of it. What it is up to is to wash the land away. The more land that washes into the sea the higher and wider the sea becomes. I was reading last winter that the sea occupies seventy-one per cent. of the earth's surface and land only twenty-nine per cent. and that if all the land surface above sea level were washed into the sea and spread over the bottom it would raise the water, fill in, only seven hundred feet."

In thinking over what he said I felt that he was correct. Just what Big Water, which the Indians called the sea, was thinking about is a guess. Anyway, rivers are all the time washing all land surface down into the sea. Someone has said that the Missouri River is too thin for cultivation and too thick for navigation. One

of its nicknames is "Old Muddy." It is so charged with liquid mud that it gives colour to the Mississippi after joining forces with it at St. Louis. Most months of the year the lower thousand miles of the Missouri-Mississippi channel are badly clogged with sand bars made up of stuff washed off mountains, plains, and the river banks. The water carries more than a pint of mud sediment to each gallon.

In going through a rapid in the Grand Cañon of the Colorado my boat struck a rock and turned turtle. So did I, more than I wanted. There are two or more pounds of sediment in each gallon of the Colorado River and my clothes seemed to take on many pounds of this in addition to the usual quantity of water which is taken up when one tumbles in with clothes on. I was lucky to strike shallow water, for, although I could swim, I could hardly keep my nose above the surface because of the weight of sediment.

The Grand Cañon of the Colorado is from six to twelve miles across and in places a mile deep. All this vast cañon was washed out by running water. And much other sediment was washed through it. The mud which I scraped from my clothes was in part from off plateaus and peaks hundreds of miles upstream.

Climbing upon a boulder I took off my clothes

and scraped and scraped them. Each pocket was full of wet rock flour. Inside, between my underwear and my skin, must have been two or three inches of mud. If this had hardened I would have been in a plaster cast. I kept scraping and cleaning off this mud. It would have been useless to put my clothes in the mud-filled water. When I was through I had a deposit of mud, that is soil, which would have grown a square yard of wheat.

Soil, after all, is mostly rocks ground fine—rock flour—mixed with minerals and chemicals. At one time the earth was solid rock, and soil was formed by water washing, freezing, and acids breaking and cutting the rocks to fineness.

Rivers not only wear out their channels but they wear off less rapidly all the land surface between each two rivers. This means that every bit of land on earth is washed and worn down by running water, rain from the clouds.

If Robert was right, and I believe he was, then every stream is something of a land pirate and is at all times grabbing pieces of the earth and sending them away to the sea. Every drop of water is a little pirate. It picks up a little grain of sand and away it goes for the sea. It travels day and night. It goes swiftly and goes slowly; it runs against boulders, snags, and has a merry-go-round in whirlpools. But it keeps going.

In places it goes over a waterfall. This may break its hold upon its grain of sand. But there are millions of grains in the water and if it does not see the right one it seizes another and downstream it goes, headed for the sea. I do not know how long it takes to travel a thousand miles along a big river, or how long from the source of the Mississippi to the sea, a few years probably.

But many grains of sand may be rushed along faster than others. Many lodge upon a sand bar where, like a stranded boat, they may wait for weeks for a high water. They may wash upon the bank during a flood and there remain high and dry for years. But sometime they will reach the sea.

This water-washed sediment fills thousands of beaver ponds. The beavers dredge quantities of it out and throw it over the dam; they raise the dam higher so as to keep water above the sediment, but the sediment finally wins and fills the pond. It may take five years or fifty.

Grass and willows grow in the mud as soon as sediment forces all the water out of the pond. Many times I have examined the earth in my camp by a stream. Often there were spruces or pines more than two hundred years of age growing in this earth. Digging into it I have many times found it to be a filled-in beaver pond. So here in the grass and willows among the trees,

rabbits and bears may play above the soil washed down by water. But a forest fire may come and consume the forest, then wind or water may start washing and blowing and this sediment from mountain tops, perhaps hundreds of miles upstream, may, after this pleasant stop, again go away on its merry journey toward the sea.

Every year the land surface all over the earth is lowered just a little by the wash of water. But during long ages this lowering makes a showing. Many a mountain has been entirely washed away into the sea. The Appalachian Mountains have had about two miles washed off them. They are about one third their former height.

The wonderful petrified forests in both the Yellowstone and in Arizona have been uncovered by the washing of water. They may have been covered with several thousand feet of ashes or other material that became rock. But water cut through it all, washing it slowly away. Of course the water often uncovers coal, gold, and strange buried fossils—records of animals that lived possibly a million years ago.

In the sediment that finally reaches the sea at the mouth of a river, say the Mississippi, there is a little of most everything: crushed-up fossils, marble, gold, coal, blue limestone from Kansas,

gray granite from Pike's Peak, yellow lava from Yellowstone, red sandstone from many states, and glaciated gravel from Canada. Then there are volcanic dust, shells of water life, and the bones of animals. Along with these in solution the water also carries minerals and acids, lime, salt, and soda. The caves of Kentucky were made by water dissolving and washing away the lime. Altogether millions of tons each year are carried into the sea by the Mississippi. There are dozens of other large rivers each carrying its burdens into the sea. Probably the rivers of the world move as much freight each day in the way of washed material as all the railroads move of their kind of freight.

Big deltas of this sediment form at the mouth of most rivers. No deltas are found at the mouth of the mighty Amazon or the mouth of the Thames River. Here the swift ocean currents sweep the material away and scatter it over the bottom of the sea. Although the Hudson and the Susquehanna rivers are daily emptying countless tons of silt and sand into the sea, no delta shows. The mouths of these rivers were recently "drowned"—that is, deeply submerged, by the sinking of the earth around and beneath their mouths. The water at their mouths is at present too deep for delta material to show, but deltas are building.

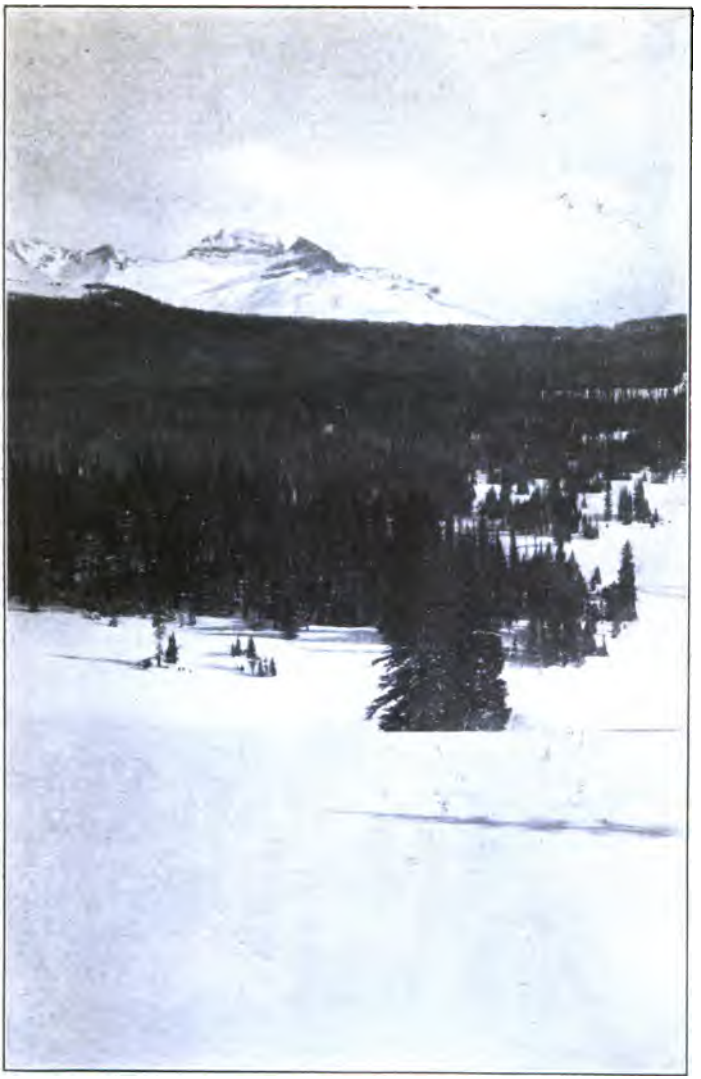


Photo by Enos A. Mills

The shortest day of the year in the Rocky Mountains

Photo by Enos A. Mills

The outlet of Fern Lake, Rocky Mountain National Park

The delta of the Yellow River, China, is said to be three hundred and fifty miles across. The delta of the Ganges is about the size of the state of Pennsylvania. The delta of the Mississippi is about the size of Florida, but no one knows how deep. At New Orleans, which is built upon the older part of the delta, a log was found in well drilling a thousand feet beneath the surface.

One mile every sixteen years is the rate which the Mississippi is building out the delta—filling in the sea with the wash off land. The city of Adra on the Po River, Italy, now is fourteen miles from the sea. It formerly was at the mouth of the river. In China generations ago the city of Pu-tai was a seaport at the edge of the ocean, but running water has built a large delta beyond it and now it is forty-eight miles from the sea. These deltas sink into the sea. Perhaps it is their own weight that causes this slow sinking. Beneath the sea, time, pressure, and its own cement change delta material into stone.

CHAPTER V

TRAVELLING WITH A BEAVER

ONE summer in Montana a trapper gave me a kitten beaver. He was a cunning little fellow in soft brown fur with an innocent round face. He had a plump body and a tiny flat tail. While I was talking with the trapper the little beaver endeavoured to show his accomplishments by methodically cutting down a willow tree that was about the size of a lead pencil.

I was out with a pack horse, tracing the old Lewis and Clark trail across the mountains, and took him with me. My bedding and supplies did not make large packs. With one of these on each side of the pack saddle there remained room enough in the depression on top for the little beaver. He was bundled in my old coat with his head sticking out of one sleeve. He could not quite fall out of the sleeve and the coat was secured beneath the ropes of the pack. Although the pack horse plodded along monotonously I never knew of his sleeping; but he may have done so. Generally when the horse

stopped he rose up as high as he could and looked around. Sometimes he protested. This was when the horse strayed away from me and went beneath low limbs or entangled willows.

Each morning as soon as I brought the pony he came close and watched the proceedings. Long before I was ready to lift him on the pack he rose on hind legs, stretched himself to full height, clawed the air rapidly with uplifted forepaws, grunted, whined, and begged to be lifted up.

Each evening we camped by a stream. The little beaver amused himself by playing, swimming, and diving in the water. In his playing he did so much diving that I finally gave him the name Diver. This name he quickly learned, and never failed to come when I called or when I whistled for him. His hind feet were webbed like the feet of a duck, while his forepaws were more like those of a monkey. He often combed his hair carefully with his fore claws.

When playing alone Diver spent minutes at a stretch with imaginary playfellows. He raced or wrestled with them and occasionally simply annihilated an imaginary enemy. He engaged in serious constructive work. He would cut a few little twigs, gnaw these into sections, and build a tiny dam. Sometimes the twigs were piled in the water as though being stored for winter food.

Diver's food was bark—usually aspen—although he frequently ate that of willow, birch, or alder. In each case he cut a small twig and from this ate the bark and sometimes a small bit of the wood. Occasionally he took a mouthful of grass, ate a mushroom, dug out a root, and sometimes nibbled at the pond lilies in the water. A number of times I persuaded him to examine a small pine. Each time he turned up his nose and sniffed as though he disliked the pungent odour. I could not get him to gnaw pine, spruce, or fir trees.

In cutting, Diver used his four front teeth. These were as thin as one's fingernail and had very sharp edges. I never succeeded in counting just how many teeth Diver had, because he ever objected to my examining his mouth, but a full-grown beaver has twenty teeth. The teeth of a young beaver are almost white, but those of an old beaver are almost orange, apparently stained by the acid from the aspens and willows which they have cut.

Diver was so young when the trapper captured him that he could hardly have remembered seeing his kind. The first beavers he saw were in a pond perhaps thirty feet from us. He stood still and looked at them for several seconds with an almost expressionless face. Then he went to them at his usual pace and had a visit.

Occasionally we camped near a beaver pond, and ofttimes other young beavers played with Diver. Now and then he would swim across a pond to visit another beaver. He seemed to be welcome, and although the old ones at times appeared to receive his visit indifferently no attempt was ever made to drive him away. Strange as it may seem, he never showed a desire to remain with his kind. Rarely did he linger with them more than fifteen or twenty minutes and he always came at once when I called.

Early one afternoon we made camp by a wide stream. Diver amused himself for a short time in the water, then went out on the sand of the opposite side of the stream. I sat on a log a few feet from the water and watched him. He dug up two or three young plants of the Oregon grape and ate them, roots and all. While he was searching for something more to eat a coyote darted at him from behind a boulder. With a cry like that of a frightened child, he dodged the coyote, leaped into the water, and dived out of sight. He came up on my side of the stream, rushed to me, and made haste to hide himself between the log on which I sat and my coat tail which hung over it.

Although there was no near-by beaver house and no beavers had been seen, yet within a minute three beavers appeared—one from up-

stream and two from down. They swam cautiously and looked carefully about with only eyes and nose thrust above the surface of the water. Presently one left the water and waddled about smelling at the place where Diver had been digging. Another came ashore at the spot where Diver had come up out of the water. As he came toward me apparently his eyes told him that I was a part of the log, but his nose declared that he was near danger. I sat still. After three or four hesitating attempts to retreat he plucked up courage, rose to his full height on hind legs and tail to stare eagerly at me. With head well up and forepaws drooping, he gazed steadily for several seconds, then gave a low whistle. At this Diver came forth from behind my coat. The old beaver started forward to meet him but on approaching closer took fright at me, whirled, and made a jumping dive into the water, whacking the surface with his tail as he disappeared. Instantly there followed two or three more splashes and a number of tail whacks upon the water. Apparently, a number of beavers who had come in response to Diver's cry were now beating a retreat.

Each night Diver slept on the ground beneath the canvas upon which I spread my bed. He took a place close to my head and ofttimes I reached out and put my hand upon him and

talked to him. He rarely moved during the night except when I rose from the bed to notice the fire or to have a look at our horse. Wolves howled, coyotes came close and yelped, but Diver appeared to think that everything was all right and himself safe so long as I lay still.

A shrill cry from Diver one afternoon told me that he was in trouble. We had camped early this day and he had gone far upstream. On the way back he appeared to have left the water and to have started across a neck of land around which the stream flowed. Here he was attacked by a lynx but escaped into the water. The lynx evidently had made numerous attempts to grab him. Wet tracks on logs showed that the lynx had manœuvred from side to side, occasionally stepping into the water. Diver had silently taken care of himself until tiring or becoming frightened and had then called for help. He kept close to my heels on the way back to camp.

Every day we saw beaver houses, ponds, and numerous places where beavers had cut down aspen and cottonwood trees. The trees cut commonly were from three to eight inches in diameter. But there were numbers of stumps from twelve to sixteen inches across. Most of these trees had been cut for food. Numerous cut pieces with the bark eaten off lay on the top

and back side of every dam. Of course many trees cut had been built into the new dams and houses, but most of those we saw had been cut and used for food.

Most of the beaver houses stood out in the pond like little islands. A few were built partly on the shore with one edge in the water. At two or three colonies we failed to find any house. Commonly where the bank was gravelly and not rocky they had a den in the bank. The den was two or three feet below the surface and several feet from the water. The passageway to this was by a tube or hole about one foot in diameter and several feet long, with the opening or entrance a foot or two beneath the water of the stream or pond. Being well beneath the surface of the water it was not closed by ice freezing in it, and being open the beavers could go in and out of their den into the water beneath the ice even in midwinter.

One evening prior to this time we camped by a beaver pond in the edge of which was a temporarily abandoned beaver house. Up to this time Diver had not seen a beaver or a beaver house. To see what he would make of this, I carried him over and placed him on top of it. He was interested evidently by the scent which arose through the half-plastered top. He put his nose against this and sniffed, and then appeared to be

trying to look down into it. Finally he climbed down to the farther edge of the house and leaped into the water. After swimming about for a time he dived and came up the entrance-way into the house. I could hear him clawing about inside. It was probably an accident that he came into this entrance-way, and once inside he would naturally be interested in the scent of his kind. After remaining for a short time he came out, climbed up on the house, and again sniffed at the top. After this he went into the pond for another swim and paid no further attention to the house.

Diver apparently enjoyed watching my camp-fire. Ofttimes of an evening he would lie watching it for an hour at a time. A number of times I purposely built this fire close to the stream or the pond by which we were camping. Other beavers several times came to the edge of the water, thrust out their heads, and there remained for minutes looking at the fire. Often I moved about to see what they would do. Generally they paid not the slightest attention to me unless I came within three or four feet of them. The presence of Diver may have given them more than ordinary confidence, yet many times I have been told by trappers that beavers are interested in watching a camp-fire.

The tail of a beaver is an exceedingly useful

appendage. It is covered with dark-coloured skin and looks somewhat like a piece of dark rubber. Diver sometimes thrust his tail under him and used it for a seat. Sometimes when standing up he used it for a rear brace to prop himself on his hind legs. In swimming he occasionally turned it on edge and used it for an oar. It served in the water as a rudder whenever a rudder was needed. But when out of the water, walking about, it appeared to drag behind him as though attached to him though not a part of him. When he was at rest he commonly tipped his tail on edge, doubled it around, and rested it against his side. On one occasion he thrust his tail between his legs, scooped up a mass of mud and carried it up on a small fallen log near by, and dumped it. On another occasion I saw him carrying two small sticks by clasping them between his tail and his stomach.

A few days before I gave Diver away I placed him in a beaver pond, then climbed a tree and took a position on a long limb that reached out over the water. I was scarcely in the tree top when a number of beavers resumed the work they had been doing. Three young beavers played with Diver in the water. In my eagerness to see what was going on I leaned too far out. The limb broke and I knocked most of the water out of the pond.

At the end of my outing Diver became the pet of two pioneer children on the bank of the Snake River. For the first few weeks the children kept Diver in the house. This plainly was too warm for him, and he was at last given a straw bed in a little dog house just outside the door. He enjoyed spending the nights in this but he insisted on being frequently admitted to the house. The river was less than fifty feet away. To this he made many a journey for a swim and a dive. Often the children went with him. By the hour they would sit on the bank and watch him or play with him by throwing sticks into the stream which he would swim out and get and bring back to the shore.

Diver frequently followed the children about when they went into the woods away from the river. They always travelled too rapidly for him. As he went hurriedly along, trying to keep up, he scolded and scolded. Finally, if they did not stop, he sat down and complained and scolded so vigorously that they usually came back to him. During the first few months they had him the children occasionally helped him along on their way from the river trips by carrying him a short distance. This he enjoyed, in fact he enjoyed taking a ride of any kind, even upon a pack horse. The second year he became heavier than the children cared to carry. Al-

though they often held him in their arms the only rides that he had were those that they gave him in a wagon and in a boat.

The three years that he spent in this place were years of enjoyment both for the children and himself. One day Diver swam downstream some distance below the house. He was out on shore cutting an aspen when a hunter shot him.

CHAPTER VI

CAMPING ON THE PLAINS

I WALKED out of Cheyenne early one morning thirty-odd years ago with a camp outfit and a week's provisions. It was late May. One mile out and I was on the fenceless, trackless plains. The prairie was green with low-growing buffalo grass and brilliant with dashes of red, yellow, and blue wild flowers on short stems. Meadow larks were singing and prairie dogs barking merrily. The sun shone hot from a clear blue sky all day.

A little before sundown I dropped my heavy pack by an old buffalo wallow near the Wyoming-Nebraska line. I could see miles across level plains toward every point of the compass; not a house, a fence, or a tree within the horizon. I was alone. I judged there was not a person within fifteen miles, perhaps not for twice as far. Although I travelled about for days I did not see a house or a fence.

For months I had planned to have a camping trip out on the Great Plains to see what wild life lived on the prairie and how it lived. I felt that

I was well prepared. I had learned to identify numbers of trees, birds, and wild flowers. I was certain I knew how to camp and especially that my camp equipment was correct. In fire starting I could have taken a prize. But I found myself embarrassed with green grass and old "cow-chips," by a treeless, rockless water hole.

At last I had a fire glowing in the darkness out in the lone wide prairie. The water hole by which I camped was a shallow buffalo wallow about fifty feet long and half as wide. Ten years before thousands of buffalo had ranged these scenes. Water is scarce on the plains, and these wallows once served both the antelope and the buffalo as drinking places. The crowding stars seemed only a stone's throw above the wide, flat prairie, and the merry coyotes were having fun all around me when I lay down to sleep.

I wasted a lot of time the next morning in trying to find something among my too numerous pieces of camp outfit. Just as I had things scattered over the prairie two cowboys came riding up. They were from a cow outfit that was drifting northward and had seen me from afar. They were grazing two thousand head of cattle and had a six-horse cook wagon and seventy saddle ponies.

"What's this, a general merchandise store?"

one of them called, pleasantly, as he viewed my equipment scattered around the water hole.

"The kid has more kitchenware than the cook at our cow camp," said the other kindly but merrily as they rode off.

The prairie dogs were yapping and scampering about and I threw my belongings into a heap and went toward the nearest dog town. They were excited over my presence: sat up and barked and chattered, and I am certain used bad language because I did not move on. When I approached nearer than twenty feet they ducked into their holes. They looked and acted more like fat woodchucks than dogs.

In a shallow ravine near camp I came close to a mother antelope and her two kids. She made the youngsters lie down the instant she saw me and then edged off, plainly with the hope of leading me to follow. But I wanted a closer view of the kids.

When I reached the spot where I supposed them lying I could not see them. A young antelope blends with the plains, plants, and soil so that it is well hidden when it flattens down. I stumbled over one of the youngsters. He leaped up and then I spied the second. But not until I had touched it with my hand did it quit playing dead and rush off with the other toward the mother.

They went only a short distance when they re-entered the ravine. I slipped down this, crawled over a ridge, and came within a hundred feet of them. The youngsters were busy suckling. One was kneeling on each side, occasionally urging mother to speed the milk by butting her. When they started across the prairie I went far around and came in behind a low ridge, planning to get close to them or to another mother with one kid whom I saw in the distance. After a number of trials and much travelling I was again close to the mother and two kids. But she scented me and ran far away.

It was time to start for camp. I looked around to figure out where it was. Out on the plains where most of the time one can see miles in every direction I had not thought of using a compass.

I had known the points of the compass all day. There was the sun a little above the horizon and I knew that beneath it was a little to the south of west. But knowing the directions did not tell me the all-important thing—the direction to camp. I did not know whether camp was miles south or miles west.

I walked a short distance to the top of a ridge. I could not see a single landmark that I recognized. Landmarks had been forgotten in the watching of antelope. The sun was setting

red in the west. This was a landmark, and as I had wandered eastward from camp I thought and also felt that my buffalo wallow camp must be somewhere off in the west.

I headed at the sun and walked rapidly until dark. I still was uncertain where camp was and stopped and made a fire. A compass will not do a fellow any good, nor will knowing points of the compass, unless he constantly use his head and keep the position of camp in mind. I should have looked back occasionally during the day and made mental pictures of the few landmarks. But I spent the night on the prairie without supper or bedding.

Daylight came grandly at four o'clock and I at once started off to back-track myself to camp. A number of antelope stood for a time on a ridge between me and the red rising sun. I headed eastward. I had walked due west after leaving the mother antelope the night before and easily back-tracked this straight line.

Back-tracking myself over the course where I had crawled, curved, and doubled in following the antelope was a task. Occasionally I got down on hands and knees to find the dim trail, or to determine which way I should follow it. This was the best of trailing experience.

Finally I arrived at the place where I had first seen the mother antelope and kids. Then,

certain of the way, I gave up trailing and started on a short cut to camp. I met a vigorous whirlwind spinning across the plains and taking with it tinware and other non-essentials from camp. "Go it," I called, and let it go. On the way I must have picked up fifty-seven varieties of my camp stuff. Then I walked upon the ashes of a camp-fire that appeared familiar. The tracks were my own. Here within five hundred feet of Buffalo Camp I had spent last night.

This experience showed me that the supreme camping test for an outdoor fellow is finding the way back to camp. He cannot do this with a compass alone unless he turn surveyor and make notes every little while. I have known many a man with a compass to become hopelessly lost. One who makes a mental log of his movements, who knows where he is every minute, will be able to return to camp without a compass or even without landmarks.

In back-tracking myself I discovered a number of Nature's points of the compass, pointers that I had not before noticed. They were plentiful enough and I was surprised not to have seen them earlier. These were made by the prevailing westerly winds. Piles of tumbleweeds against the westerly sides of sagebrush clumps. On the eastern leeward side of these clumps were sand drifts. These formed east and west lines here

and there that showed long distances. Here were home-grown compasses that would not get out of order, or become lost or broken.

I was eager to see the country off in the north beyond the North Platte River. Leaving most of my things at Buffalo Camp I started northward one morning, travelling light. I would return to this camp in three or four days. I did not stop often or long, but headed northeast and at noon came to the river. Following downstream along its low bank I saw a number of logs on a sand bar. With willows I lashed two of these logs together and after a delay of only an hour pushed off into the water with a pole. Annual high water had not yet arrived and in a few minutes my two-log raft was on the sandy, shallow farther water edge. I tied the raft, thinking I might come that way again, and went on. When evening came I was a long distance from Buffalo Camp and the river with an empty canteen. I had not seen any water since crossing the river, about twenty miles back. A map that I carried indicated a small stream a little more than twenty miles off to the north. As I was northward bound I concluded to travel on through the night.

It was a perfect evening and off I walked across the lonely prairie, heading for the North Star. Clouds came floating across the sky and

in watching closely for the star I walked off a bank. It seemed as though I had stepped into a cañon. But it was only a gully about five feet wide and about as deep. Uninjured, I climbed out and went on, but I added gullies to my plains woodcraft.

In a little while all stars were shut out by clouds. I went on more slowly so as not to stumble or step overboard again. I might be going too far to the right or to the left. If I was I might walk all night and still be as far from water as when I started.

Suddenly something leaped to its feet and dashed through the sagebrush on my left. It sounded like an elephant. I turned to see what this was and took a header over a bunch of sage, landing in a pile of tumbleweed. This reminded me. Here were guides—weeds drifted against the sage by prevailing westerly winds and sand in shelter to the leeward. From these I easily faced north and went on across the plains.

At intervals far off in the north I saw a dim light, perhaps a camp-fire. It strangely appeared to be as distant as a star. It disappeared and reappeared as my viewpoint changed a number of times. As it was straight into the north I had begun to use it as a guide when it grew dim and then faded. From time to time I came upon sage clumps. I checked directions

and, being confident that I was right, went on to water, which I found at a little past two in the morning.

After sunup I tried to locate the source of the fire that I had seen during the night. With glasses I discovered the cook wagon of a cow camp miles away in the north. I started across the prairie toward it, planning to spend the night there.

On the way I stopped twice to watch prairie dogs and to examine their "towns." In one town a mob of its inhabitants was trying to kill a rattler or to drive him out of the city limits. He finally ran into a prairie-dog hole. Two or three dogs, all excited, looked into the hole while the others all together kept up a yapping and yelping. I planned to return to the plains sometime and have several days getting acquainted with the life of these fat, brown little people who live in towns on the prairie.

The two cowboys who had called at my camp were the first men I saw as I approached the camp wagon. They asked if I was still running a dry goods and hardware store. I laughed and told them I thought to add a grocery department. I bought supplies enough for several days. I did not tell the cowboys that when I left Buffalo Camp the whole prairie-dog village was yapping at the pile of non-essential camp

stuff that I had left behind. I did not need it and never went back for it. From that time I planned to "go light."

The cow-camp foreman told me of a rough sand-hill region about twenty miles off to the northeast where I could see a beaver colony. There were other things of interest, too, but beavers out in the plains were enough. Again I travelled.

A long day's journey landed me in the northwestern corner of Nebraska, perhaps somewhere in what now is Box Butte County. A flood of some years before had made a long, narrow island in a little stream and on it were a number of old cottonwood trees. One of these stood on a ten-foot bank. Beneath its flat, spider-web roots a badger and perhaps later coyotes had had a den. As the roots held the earth and would make a good roof I cleared out the loose sand and enlarged this den into a cave. Then I cut a number of sods from the bank near by and closed up part of the opening. In less than a half day I had a shelter that would have made any bandit happy.

I called the place Kingfisher Camp as a kingfisher had a nest hole in the bank close to my cave. Here I had shelter, wood to burn, and running water. The first night in this camp was rainy—the only rain I had while on this trip.

My equipment now consisted of a haversack, one blanket, one waterproof canvas, a large and a small tin cup, tin pan, canteen, hatchet, pocket-knife, and a field glass. This seemed to be enough. I did not have any kind of a gun. Later I often carried still less equipment. I have found a sleeping bag the most satisfactory bed, but I sometimes went without bedding.

Many of the cottonwoods along this stream had fire scars on the westerly side of the trunk. The bark on a number was burned off on one side nearly as high as my head. I puzzled for two or three days why this was all on the westerly side. Against the westerly side of other clumps of cottonwoods I saw quantities of windblown trash, leaves, grass, and tumbleweeds. Then, of course, I knew the burning of west-side trash piles would make fire scars on the westerly side of tree trunks. Every few years the plains are swept by prairie fires. These fire-made tree blazes were a new point in woodcraft.

To watch the ways of antelope I one morning climbed to the top of a hill, waved my hat, then looked through my glass at the antelope on a hill miles off. A number saw me and flashed or opened their white rump patches. This flashing was seen by antelope still farther off on the horizon; for I saw their rumps suddenly show white flags. By watching and sig-

nalling each flock becomes a sentinel for all other flocks. I imagine that an alarm flash may be relayed to the third or fourth flock in the distance.

The antelope is the animal of the plains. He is adjusted to treeless, flat, level distances. Most animals aim to escape enemies by running out of sight. But the antelope often cannot get out of sight on the level, treeless plains. He escapes by having the right kind of eyes, legs, and signals. He probably is the swiftest of long-distance animal runners. His eyes are large and almost telescopic.

The third day that I was in Kingfisher Camp I started to follow up to the source of the stream that passed my cave. About two miles up I came to the beaver dam, probably built the year before. There was not the sign of a house. I smelled something very like beaver and, looking down, saw a hole where an antelope had thrust its foot through the top of a beaver den that had been built under the bank. A tunnel whose entrance was concealed more than a foot under water reached the den from the pond.

Several miles up I left the channel to make a long half circle through a hilly, rough country and try to find my way back to camp. I wanted to get the habit of taking my reckoning, so that I could be certain that I could do so all the time

without thinking about it, and do it right. I had good experience. Camp was where a camp usually is—where one leaves it.

In Kingfisher Camp again I sat down and traced my route in a notebook. I was surprised that I remembered the turns and the objects passed. In making this tracing my memory insisted on recalling a number of objects I had not remembered passing. It recalled a tree with an old axe mark on it. I could not remember seeing this; in fact, I could not believe that I had seen it. The following morning I was by this tree before sunrise. It did have an old axe mark on it; one, so the annual rings said, that had been there for twenty-four years. I must have been watching the way closely, as well as other things even more interesting, but I saw this landmark.

In Alaska, Canada, Mexico, and in every state in the Union I have sat by a camp-fire all alone. And the most useful resource that I had in all these hundreds of camping experiences in all sorts of places and in all kinds of weather was in ever having my reckoning without stopping to take it.

A captain must often take reckonings; wind and tide drift the ship out of its course. The man at the wheel must have a compass, but this alone cannot navigate the ship; the compass

shows the north, it does not show where in the ocean the ship is, or the direction to port desired. These must be determined by mathematical reckonings.

The captain, pilot, scout surveyor, timber cruiser—each is doing a work somewhat akin to the work of the others; and the explorer must be a combination of all these and something more. A boy out camping in a region new to him is an explorer even though he does not wear buckskin and have a beard—or go far from home.

One morning two coyotes came near camp. I followed them nearly all day. "Will I be able to find my way back to camp?" I asked myself. I had looked back at landmarks, noticed turns, planned to remember ravines, hills, prickly-pear beds, and distances from one turn or landmark to another.

The coyotes made loops, turns, went off over a confusion of sand hills, travelled toward every point on the horizon, and kept me hustling to keep up. For a time both coyotes were together. One then turned aside and dug out mice and the other appeared to be leaping into the air after grasshoppers. They tried to slip up on prairie dogs. One hid while the other made a dash into the dog town. It failed to catch any and went on for a short distance and sat down. While the dogs were interested in watch-

ing him the other coyote slipped up close and made a dash after one farthest from the hole, but the fat dog won by half a length.

While the coyotes were together on a ridge another coyote passed near. They watched him, but he went by pretending not to see them. They hunted on. One turned to right of a sand hill and the other to the left. I watched the one on the right slip up and peep over into a ravine. He then descended slowly as though waiting for the other coyote to start something. It started a jack rabbit. This was overhauled before it could get out of the rough ravine.

Here, as in the mountains and forests, I constantly tried to get close to animals. I would crawl to the top of a hill or ridge and peep over before showing myself. I would peep out on the plains before climbing out of a ravine. Often this manner of stalking brought me close to a coyote or an antelope, and frequently I lay for a long time watching them without frightening them by showing myself.

As the afternoon was well along and as I had travelled twenty miles or farther in a roundabout way, the thing now was to go directly to camp. I felt it could not be more than five miles away, across the confusion of sand hills. To be certain of my reckoning I sat down by a smooth patch of sand and marked the crooked line in it which

showed my kinked, looped, and tangled trail since leaving camp.

To keep in mind just where camp was at all times I hit upon this plan, which I have since used hundreds of times. I imagined myself attached to camp with a line and reel which promptly pulled in slack and also kept a steady pull on myself. At all times I knew where camp was and where I was. This plan kept before me a map picture of the locality and mentally showed me camp. I could estimate the distance.

Off I started down the sand hill for camp. It was dark before I had gone a mile. I had to travel slowly for these hills were cut with deep gullies. Twice I had to go around a long, deep gully. If ever I could get down on the level plain I could go straight to camp, even though blindfolded, I thought. There was no fear in my mind of getting lost. And I did not. Out into the level prairie I walked at last, and made my way easily to Kingfisher Camp. By blazing cottonwood camp-fire I marked my day's trail, its loops, reverse loops, circles, zigzags, and twists upon a whitened buffalo skull. Then I drew it in my notebook. It had been my most eventful day in the realm of woodcraft. I could now ramble over the roughest of country and at any instant, without consulting compass, point my finger at camp.

I knew only a few of the plants and animals on the plains. The yucca, a green, bristling, plant-porcupine, was one of these. I carried home with me a few pressed plants which I wanted to know about. After each of the camping trips that I made later I went to a library as soon as I could and also talked with people who might give me information about some of the new plants or birds seen on a recent trip.

Often I could not find what I wanted to know. Sometimes both books and people gave misinformation. By and by I learned that there were many points concerning outdoor life that I would have to find out for myself. I had no end of fun and camping in exploring for what I wanted to know. Beavers, bears, and mountain sheep gave me many a day in the wild places between camp-fires. The greatest fun connected with camping is tracking, trailing, and at last discovering another chapter of a real unwritten nature story.

I carried a notebook but I used it sparingly. Sometimes I measured something and wanted the exact figures. Or I put down the unusual, or made a note of things I wanted to find out. Here are a few of the things written while out in the plains:

"Sage is the only thing antelope ate while I

was watching them. Queer if this bitter stuff is all that is eaten."

"In a lone cottonwood there were nests of bluebirds, woodpeckers, wrens, and robins. Pretty thick, yet peaceable as far as I saw. I had thought that each pair claimed at least four trees."

"Prairie dogs act more like chipmunks than dogs and look more like pigs than dogs. Who could have named them dogs?"

"Find out about that story that owls, prairie dogs, and rattlers live in the same hole."

"Coyotes seem to have more fun than any other animal on the plains. They are hollering around thick all night. Last night it sounded like several thousand, but this morning there were only two in sight."

"I cannot hear anything mournful in the barking and howling of coyotes. Sounds more like a gang having a time. At times last night they were signalling. One near camp started a song and stopped; then another about two miles off tried the same song; when he quit a third who sounded a million miles away tried his voice."

"The meadow lark seems sometimes to say, 'By the Great Gewhittaker.' He is the best singer I have heard on the plains."

"To-day saw a prairie-dog town that was a

quarter of a mile across. Thousands of holes close together. Each had an opening that the top of my hat just plugged. Each hole had a dam of dirt around it that looked like a little crater. I stepped off ninety feet square, size of a baseball diamond, and inside this there were forty-six holes."

Most camping trips were made alone and without a pack horse. During each trip I watched for new animals. The ones I had known always gave new performances. Often I sat for two hours watching a mother bird feed her young, or sometimes it was a lesson in flying. Frequently I came upon a battle between ant colonies. The last day on the plains, while two colonies were fighting around and all over a big ant hill, two flickers came along and ate hundreds of the fighters.

When vacation ended I returned to the cow camp and one of the cowboys took me to the nearest railroad station and I went home to my log cabin in the mountains at Long's Peak.

Of all the useless hardware which I carried around during my earlier camping trips a big compass was the most unnecessary.

A compass will get out of order or lost or jammed. And magnetic iron in some places influences it so strongly that its needle goes round and round like lost geese. The needle

is unable to calm down and point at anything definite. And then it is sometimes sufficiently influenced to point wrong without one suspecting it. A man with whom I was camping was uncertain as to direction and climbed on a quartz outcrop that carried iron and read his compass. The needle pointed east and not north. He arrived in camp in time for breakfast instead of supper.

Everywhere outdoors Nature has compasses, guideposts, landmarks—markers and pointers. East, west, north, and south are shown. Frost, fire, ice, water, trees, and plants; these in designs, symbols, signs, and showy colours are as thick as flags, banners, and bunting on Celebration Day.

In deserts, most vegetation on steep, northerly slopes and north facing cañon walls.

In arid territory, most grass on northerly slopes.

More moss and lichen are on northerly sides of trees, cliffs, and boulders that are found in the open.

In Canada and Northern states, rocks marked with north and south scratches from southerly glacier flow. If these vary from north and south the local point will be uniform.

Prevailing direction of wind near seashore in many localities is pointed by limbs of trees.

At timberline in most mountains many of the trees are flag-like, all limbs stream leeward.

During years of camping I have used all these signs and many others.

I once said that if carried blindfolded into the Rocky Mountains I could examine a few trees with my hands and tell the points of the compass, the altitude, and the season of the year. And also that in determining these trees I could name the plants and the kinds of insects, birds, and animals most likely to be found near these trees. Afterward I became snow-blinded on the summit of the mountains when I was alone. I started down off these high, snowy mountains with their icy slopes and precipitous cañons believing that I could find my way without eyes. Once down to timberline I determined directions by feeling of trees. Finding Engelmann spruce and limber pine and knowing on what slopes these grew, I used these guides and compasses. By using these and other reckoners I managed to get down off the mountains, a journey of perhaps twenty miles, without breaking my neck and with little suffering.

In each state in the Union there are wild places in which one would be allowed to camp, and in which one would have fun camping. The camper who is a real explorer makes the most of each outing, will receive from these experiences

the best possible preparation for camping in the wildest places on earth.

Most men and women, boys and girls, go camping, just to go camping. They have a fair time. Others go camping chiefly because it gives them the opportunity to fish or hunt or take pictures. These campers are certain to have a good time. As I think of it now, after hundreds of camping trips, I went camping chiefly because I enjoyed watching the ways of birds and the habits of animals. The rocks, the trees, and the flowers caused me to look at them again and again. So, too, did the mountain tops, the cañons, and the lakes. I enjoyed winter camping as well as summer camping and camping on deserts, plains, and in the forested mountains. I was ever excited to know *how a plant or animal came to be what it is and where it is.*

CHAPTER VII

THE LION PLAYS SOFT PEDAL

AT TIMBERLINE on Specimen Mountain I came upon the fresh tracks of a mountain lion. He had climbed a corner of the mountain to timberline and here could look off to right and left. I followed his tracks up the snowy slope to read his story.

Near the summit the lion crouched for a time behind a low ridge, evidently to watch a number of mountain sheep near by. While keeping out of sight behind the ridge, he worked a few hundred feet farther around, perhaps toward a lone sheep.

Tracks in the snow showed that at the opportune time the lion leaped out and rushed between a lone young sheep and the flock. With another dash he frightened it far down the slope and away from the others. The many zigzags and doublings of tracks on the mountain side showed that the sheep had repeatedly tried to dash back to the flock; but each attempt had been foiled by the lion.

The lion held the upper mountain slope and re-

peatedly crowded the sheep toward a steep slope or into a narrow gully. After cutting the sheep off from help, the lion's game evidently was to wear it out.

At one point of vantage the lion lay down; but not for long. The sheep climbed a precipitous crag and made a dash up the slope. It narrowly missed passing the lion, but was again crowded down the mountain. After this bold move the sheep's tracks indicated that it was tiring; it made fewer dashes, and the lion crowded closer. Finally, after a few hours of effort, the strategic lion crowded the sheep more than a mile down the snowy slope and leaped upon it.

After a feast the lion climbed a near-by cliff and lay for some time. He returned to his kill for another feed; then, leaving the remains, edged around the side of the mountain. He came into his up-going tracks at timberline a short distance below where I had discovered them. After a quarter of a mile the tracks were lost among bare rocks; among these rocks he may have had a den.

Much that is known concerning the character of the lion has been learned from his tracks; he is so watchful that rarely is he seen in action. His tracks show that he is extremely curious, that he investigates many things of no great concern to him. He constantly strives, like a

scout, to keep out of sight, has endurance, usually procures food by stealth, is easily frightened and stampeded, and is not ferocious.

The tracks of another lion kept me active and entertained for about fifty hours. I came upon the tracks in a cañon where he had captured a grouse. Climbing out of the cañon the lion walked along the top of a ridge that led toward the summit of the Range. Near timberline another lion track crossed. On examination, these cross tracks and those I was following proved to be of the same lion. Had these cross tracks been made before or after the ones I was following? I could not be certain, but concluded to follow the cross tracks down the slope.

At one place the lion had either played with a porcupine or had worried him. The tracks showed that he slapped at porky, ran rings around him, leaped over him, and had a lively time all the way across an opening which the porky was crossing.

Leaving the porky the lion made his way down a willowy gulch, keeping out of sight, and headed straight for the cañon in which I had discovered his tracks.

I followed the up-going tracks to where I had left them at timberline. After half a mile these swerved sharply to the right. The lion had slipped up close to the edge of a cliff from which

sheep often looked down while sunning themselves. A single old sheep had evidently received a message of the lion's approach and had leaped over and gone down the slope.

The lion had then climbed up a moderately steep trail toward the summit. After about a mile he met, or nearly met, another lion coming down. This was on a smooth, treeless ridge. Each appeared to have purposely kept a trifle to the right of the wild-life trail, about fifty feet apart.

When opposite each other they had turned and faced, advanced a few steps, and sat down. The one coming down the slope appears to have started on first, for the one I was following had turned as though to look after him. This may or may not have been normal lion etiquette.

On a wind-swept place the tracks vanished. Half a mile farther I found them. What the lion had done in the interval is blank. But on the way up the slope time after time he came up behind a rock pile on the ridge. Around the right side of one he peered before showing himself, then on to the next rock pile; always first having a look before showing himself, whether he went to the right or left or over the top.

Near the summit a flock of mountain sheep had moved off to the left and then turned to watch him pass. United and with solid footing

they evidently were not afraid of the lion. Except in drifts the snow was not more than a foot deep. When the snow is deep and crusted so that sheep break through and the lion does not, then he slays and slays. The lion is not heavy, rarely more than one hundred pounds, is agile and powerful. His feet are large and soft and he can readily get over muddy or snowy places where heavier animals like deer and sheep with small, hard feet, have difficulty.

After passing the sheep the lion went on over the top as though planning to go down the other slope. But he faced about and came back along his track for a quarter of a mile. Then turning off to the right he cautiously made his way from crag to rock and came close to the sheep passed on the summit. Then a detour of half a mile and he climbed on a cliff behind them. From this he could watch them without being scented. Here he appears to have remained for hours. But the sheep did not go near any point from which he could leap upon them.

He left them and started down the mountain, heading eastward for the upper end of a gulch about three miles distant. I climbed about for a little while then again followed his tracks. The snow was partly drifted, and a number of old drifts, made up of several snowfalls, were large and deep. On the way down he came upon

a tuft of dwarf willow that was drifted under and which sheltered a number of ptarmigan. He leaped upon this snowy tuft, but the birds escaped.

Down in the woods the snow was about two feet deep but on the slopes above treeline about one foot. The lion had followed along timberline for more than a mile, keeping out of sight behind the front of dwarfed spruces or willows. Here and there he had sneaked up behind a tree screen and looked down into the openings among the scattered trees. Finally he came close to a number of sheep which were feeding or lying down in a place off which the wind had swept most of the snow.

From this discovery point he turned back for a detour and came in below the sheep. He crept up on a rock pile close to them and watchfully waited for hours. The sheep fed away from him. Circling far around he came to a tree clump toward which they were feeding. But here the sheep had evidently scented him, for they had raced off in alarm, and moved up the long slope toward the summit where the lion had watched the preceding flock. The lion followed.

The sheep and the lion were going up as I was coming down and passed within five or six hundred feet. We were separated by a

low ridge and neither sheep nor lion, judging from their tracks, had heard or scented me. I had not suspected their near presence. Both sheep and the lion had travelled leisurely. There was nothing to indicate how closely the lion had followed them, nor any sign to indicate that they knew they were followed.

I spent the night at timberline, and the following morning took up the trail. A short distance from camp I came upon a fresh lion track, one made during the night. I followed it. This lion had crept up to within twenty feet of my camp, taken a long look, and then climbed a cliff from which she could see me. She hurried off the rear of the cliff as I trailed toward it. Going out on the ridge to my tracks of the evening before I discovered that this second lion had been trailing me—just how closely or how long was an interesting speculation. Hoping to find out, I set off for the summit again.

Close to the top, near where the lion had lain in wait for the sheep, I came upon the track of the lion that was following me. She had been close. One place where I had lingered she had cautiously crept near. She could have leaped upon me. But had chance suddenly brought us together, each probably would have disfigured the skyline with figures speeding apart.

I returned to the first lion's tracks and down

turned to follow these to the top of a little ridge, then returned to his former tracks and course. A quarter of a mile farther he again turned aside to follow a lion's tracks, this time beneath an enormous wreckage of large rocks. There may have been a den somewhere among these rocks.

His tracks then descended to lower and more open territory. He had called at a beaver pond, evidently hoping for a meal of beaver, and climbed part way up the willow-covered house and lain down. Through the ice close to the house there was a hole which the beavers had kept gnawed open, and through which they came out for air and to sun themselves on the side of the house.

Judging from the melting and compacting of the snow, the lion had remained on the house for hours, watching this ice hole. He had then gone off and wandered here and there through the willowy flat below the beaver pond without securing anything. He then returned to the beaver dam at a point where all the outflow of the pond had been led through a hole about the size of the average telephone pole. This hole enabled the beavers to come out of the ponds beneath the ice roof or cover which was more than a foot thick. At this point the lion had tracked about as though watching for a beaver.

Not securing anything he returned to the beaver house and lay down in another spot. Again he must have waited and waited, patiently as an Eskimo by a seal hole.

A lion has the capacity to lie long in waiting, and I have known of their remaining on a low cliff, watchful and expectant of a kill, for nearly thirty hours. At last a beaver had come forth, but whether in the daytime or at night I could not be certain. A line of dim, muddy tracks led from the hole and ended several feet beyond with the ice stained with blood and fur.

One autumn when I was tramping in high altitudes I saw many news stories in which lions had a part. Two cottontail rabbits and one snowshoe had been captured by the same lion in less than twenty-four hours. A few miles farther on this lion came upon the track of a three-footed lynx with a bleeding, broken forepaw, as the snow records fully showed. The lion followed these tracks nearly two miles where they entered a den. Here the lion lay down to watch and perhaps rolled over on his side for a snooze. But the cat had not come out.

This same lion a day or so later had come upon my tracks in the edge of an opening. He first edged away from them and walked entirely around the opening and came back to the tracks near where he had first seen them. Here he

played. He crawled up close to the tracks, by sneaking behind a willow clump. From behind a big log he leaped and landed by the tracks. There was a confusion of tracks, as though there had been a struggle.

But all this was make-believe, for his actions indicated that he knew these tracks were associated with human scent. As there are only a few known cases of lions attacking humans, and these probably by mentally deranged lions, this lion was probably amusing himself by an imaginary attack and fight with a dangerous enemy.

I was tracking a North Park lion when the tracks showed that the lion had been suddenly alarmed. He had dropped down, then crept forward under cover for a look. He stood up to listen, then made off at high speed. He had heard or scented the lion dogs of a hunter. These dogs were soon on his trail, and in following his tracks I came to a place where he had tried to throw the dogs off scent.

This lion was running westerly. It had almost passed a cliff when it stopped suddenly, faced about, and went back along its trail for sixty or seventy feet, then leaped upon a boulder and from this upon the side of the cliff perhaps eight feet above its trail. From this point it made its way around the cliff, climbing up some thirty or

forty feet, and circling to within fifty feet of its former trail leaped off in the snow and galloped away toward the southeast.

This ruse had delayed and confused the dogs for more than an hour. But they had again found the trail and within a quarter of a mile the lion had climbed a tree.

The fox, lion, and many other animals realize that they leave a tell-tale scent. But the grizzly is the only animal which appears to know that he leaves visible tracks which tell his presence and which reveal the direction he is travelling.

The following day, about four miles from the scene, I came upon a lion track that appeared comparatively fresh, and along it I trailed on snowshoes. These tracks led around openings in the woods, over cliffs, and into a cañon. After following them nearly all day I came to where they were joined with snowshoe tracks, which proved to be mine of the day before. All day I had been trailing a dead lion. This did not matter, as I was only reading the stories in the tracks, but I had badly misjudged the age of them.

Another time a lion track led me along a wild-life trail to the shelf of a cliff about ten feet above the snow. The trail was between this cliff and another rock about twenty feet away, but deep-drifted snow had caused the trailers to edge close to the rocks on which a lion was concealed.

On the shelf he had had a long wait. A number of mountain sheep had evidently scented him a short distance before reaching the place and had turned out of the trail, tramped about, then turned back.

But three or four deer had come along, and one big fellow, all unsuspecting, had stopped a little below the rock. The lion leaped. His compact appears to have caught the deer off balance and knocked him over. But he regained his feet with the lion clinging on, perhaps to the top of his neck; and again on his feet the deer leaped down the slope. The lion's shoulder crashed against the point of a broken tree limb, knocking him off into the snow. He crippled slowly down into the cañon, using only one front foot. Probably one shoulder had been broken.

Coming upon tracks in the woods one February, which showed a lion travelling leisurely, I followed. He kept almost a compass course toward the northeast, down through dense spruce woods. A sudden jump to one side, followed by a long wait, and evidently he had watched from behind a spruce tree. Then he had edged off to the right, advancing cautiously from tree to tree with long pauses to look or to use his nose or ears. After moving through nearly half a circle he suddenly retreated one hundred feet. Then another advance, and another precipitous retreat.

Photo by Frank H. Rose

A Black Bear cub

Photo by Enos A. Mills

Bear claw marks on aspens

Then he returned to the place where he was first alarmed and edged to the left, advancing more rapidly. After many advances, retreats, and changes of course, he approached an opening between spruces beneath which was a bear den. He paused here for a moment, then went on his way. At the point where he paused I could sniff rank hibernating bear odour on the air.

After only a few minutes along another lion's tracks these were joined by the tracks of a grizzly. A black bear had crossed these. Following the lion's and the grizzly's trails less than two hours I came to where the lion had killed a colt. He had eaten his fill and lain down, and while evidently planning another meal off the colt the grizzly appeared. The lion rushed up to his kill. Toward him the grizzly had slowly advanced, without a stop. Evidently the lion had struck at him, then dodged back and stood for a time watching the bear feed, and offering jarring, jazzing accompaniments. Then the lion had rushed the grizzly, and after two or three rushes the lion had been knocked sprawling, and on arising the bear had flung him a few yards down the mountain side.

The lion lost his kill, but on circumstantial evidence—the grizzly at the feast—the horse owner offered a reward for the horse-killing grizzly.

CHAPTER VIII

FOLLOWING A CONCEALED TRAIL

IN THE early morning a posse of cowboys assembled to hunt down the fellow who had stolen the foreman's horse in the night. The thief was generally believed to be Scott Ashton, who, the previous day, had robbed the bank at Pinyon. Every one of the pursuers was a man of worth—a frontiersman who carried the law on his hip.

But the trail they followed showed that this thief was a master at hiding his tracks. He had gone out of one corral gate, then around to the opposite one and entirely around the corral before striking out westward. He had kept alongside the road the first mile, then ridden in it a short distance, and again turned out in the grass.

For several miles this road to the west ran through a cañon, and there was no way of leaving it. Beyond the cañon, on top of Tongue Mesa, it split into three forks. As the thief's tracks were found in the cañon, and he was apparently heading for the mesa, the foreman

directed all his men to spur along to the top of that elevation.

A little behind the others, carefully following the trail, was George Moore. He did not hear the orders. The posse stirring dust a quarter of a mile up the road, hearing two shots, came hurrying back.

"If this thief is Scott Ashton, who is carrying $20,000 of the insides of the Pinyon bank, you will never catch up to him unless you stick to his trail," said Moore. "We shall be lucky if we are able to follow it. He often got away from the Apaches by fooling them with new trail tricks. He has already doubled on us."

The men on the San Pablo cattle ranch in New Mexico knew that George Moore was one of the best cowboys in the outfit, but no one suspected that he was one of the best trailers—a trail detective.

Knowledge of human nature, a wide-awake imagination, experience, and peculiar skill are required to make a good trailer. These qualifications he must have in order to see through the schemes of the man who is trying to get away. With a moderate start a skilful trail man will readily escape from a well-equipped posse unless someone in pursuit knows the tricks and the strategy of trailing. The cunning fox and the grizzly bear—masters in trail concealing—com-

monly escape not so much by their speed as by confusing those after them—by going in one direction and fooling the pursuers into thinking that they have taken another.

Moore had shown unusual interest in the preparations as the cowboys hustled to be off early in pursuit of the thief. Though not one of the number selected, Moore announced that he guessed he would go along. The foreman said, "All right," pleasantly but with no enthusiasm. Inside of an hour, however, the foreman and everyone in the posse was taking orders from Moore.

After his surprising announcement that the thief had doubled on them, Moore showed his comrades where the man had turned in a rocky place about two miles west of the ranch and had ridden back toward the ranch, keeping in the grass some distance from the road. As all galloped along watching this trail, the foreman ordered Moore to take charge of the posse. Moore at once asked three to drop out, leaving only the foreman and one cowboy.

Following the tracks, they found that the thief had ridden past the ranch and entered the road on a trot, continuing eastward for hours. He knew how to make time and yet spare his horse. Occasionally he travelled at a walk; now and then he galloped a short distance;

but most of the time he went at a trot. When a horse is walking he brings his front and hind feet down so that the hoof makes a flat, equally deep impression all round. In trotting the front feet sink deepest at the toe, and in galloping they strike deeper than the hind ones. In running, both front and hind feet strike hard and dig deep, causing the dust to splash; or they may tear up and throw the earth.

After about thirty miles on the main road, the trail turned off on a dim right-hand fork. The horse had galloped along in the grass for half a mile or more. Moore sent the other two men down the main road to see if the thief had come back into it farther on, while he followed the trail to the right. After going a mile down the main road and finding no tracks, the men returned to Moore. When they came up they found him crawling along on hands and knees, carefully feeling the faint tracks in the grass-covered earth.

"That cuss has pulled the shoes off his horse," he remarked, "and I am trying to find which way he went. He has not gone on in this direction. The chances are that he went back to the main road, thinking we should not discover that he had pulled the horse's shoes."

They started to circle in order to pick up the trail where it led off from the confusion of

tracks. The thief had walked his horse about and back and forth, making the ground as criss-crossed as he could. In a minute the cowboy called: "I have it!" He was a crack trailer when it came to following dim or old trails. But without experience in following trails concealed by man, the tricks of the thief, as Moore read them, greatly interested him.

The line of barefoot horse tracks led diagonally across a cactus-covered stretch and came back into the main road about two miles beyond the forks. The trailers read the actions of the thief as they followed his tracks. After galloping a few miles he had slowed down. Twice he had stopped in the road.

"He is up to something," said the foreman. "He probably wants to leave the road at some place, most likely, where he can best conceal his trail. It must have been daylight when he reached here."

From the hill where he stopped last he evidently had seen a herd of range horses a mile or two south of the road. Out to them he galloped. He drove a number of them back to the road on the hillside. The horses had scattered, a number crossing to the north side of the road, then wheeling and recrossing to the south side. Here and there among these many tracks the thief had ridden, leaving his trail involved and indistinct.

Moore made no attempt to find the trail here, but with his companions rode on beyond the numerous tracks and examined the main road. But the trail was not in that direction, and all returned to the place where the horse herd had crossed the road. After vainly seeking a trail on the south of the road, Moore joined the foreman and the cowboy on the north. The foreman had found the trail and had stopped to adjust his saddle when Moore came up. Moore rode on a short distance, then suddenly swung out of the saddle and stopped to look at some tracks. He took off his sombrero and scratched his head.

"What is it?" called the cowboy.

"The tracks of a horse that appears to have wings," said Moore. "Here a horse with shoes on appears to have alighted, for the tracks begin at this place." Then after a moment's consideration he added: "That cuss has stopped and put shoes on his horse—not the shoes he pulled off, but another set. And he has changed his own shoes, too. He certainly is a genius for taking pains."

At a swinging trot the three trailers followed the trail northward across the four miles of mesa. The mountains rose steep and rocky beyond the buttes on the mesa's edge. The thief purposely crossed a rocky stretch between the buttes where

no telltale tracks would be left. Then, a short distance beyond, he tried one of his cleverest schemes. He crossed a rocky stream at a place so rough that the trailers did not follow in his tracks but crossed a little below. On the other side they found themselves in a grassy space of a few acres. Here they discovered the tracks of two wandering horses that apparently had been grazing.

"Has this fellow been joined by reinforcements?" asked the cowboy.

The foreman turned to the left and examined the farther edge of the grassy place to see if a single line of tracks showed in that direction. None were found. Moore swung out of the saddle, tossed the bridle reins over his horse's head, and, leaving the animal to graze, examined first one line of tracks then the other. He followed these through the grassy space, beyond which they bore off to the right and crossed the stream.

Moore went downstream to the point where the thief had crossed in entering the grassy space. After standing here for a moment he followed the stream back to the place where the two grazing horses had crossed. He followed these trails a short distance up the hillside and then went back where they crossed the stream. He was exploring upstream when the foreman and

the cowboy came along. A short distance from where the two trails crossed the stream Moore stopped and took off his sombrero. The cowboy and the foreman, eager to know what new discovery had been made, went to him, leading his horse along with their own mounts.

"This is too much for me," said the cowboy. "I can follow a trail when most of the tracks are missing, but not one where there are too many tracks."

Moore was standing in a bushy growth of young oaks when the men came up. "This kept me guessing for a while," he said. "But there is his trail. Evidently the thief is heading for Lost Basin."

"But this is a trail coming downhill," said the cowboy.

"Yes," Moore agreed, "the tracks are going downhill, but the trail is going up. Look closely and you will see that the cuss backed his horse out of the stream and up to these bushes. In the bushes he turned around. The trail on the other side of the bushes leads uphill."

"Of all the dime novels and wild detective stories that ever got into print," said the cowboy, "this beats them all."

"But what are the other tracks?" asked the foreman.

"I will show you in a minute," said Moore.

"Look first of all where the horse was backed. He scraped the earth and threw the gravel in the direction he was going. His short steps show that he was going slowly. Had he been moving slowly and moving toward the stream he would not have scraped the earth with his feet nor scattered gravel about. The grass leans both in front and behind the spots in which he put his feet down. This would not have happened had he simply passed downhill. When a horse is travelling through grass, unless this is more than half his height, it is tilted and leans backward behind each footprint. Let a man walk through the same grass and it will be pushed and slightly tilted forward.

"What that fellow did after crossing the stream into the grassy space was to ride through the grass zigzag, as if allowing his horse to graze, then came over and crossed the stream again. Riding a short distance up the hill, he turned and went down and recrossed the stream at the place where he first crossed into the grassy space. Again the horse zigzagged through the grass and again crossed the stream, going up the hill, close to the first line of tracks. This made it appear as though two grazing horses had come out of the grass and gone off together. The third time he returned to the stream at his first crossing. But this time he did not cross. To hide his trail

he followed upstream in the water and finally backed his horse out as you know."

"He pulled off a mighty clever job," said the foreman.

"Yes," said Moore, "but it took him longer to do his work than it has us to uncover his tracks. But now we must get him. He is not far ahead and cannot possibly take the horse farther than Lost Basin. It is too rocky and steep. Probably he intends to camp in the basin for a few days and then come out after the excitement is over. He has concealed his trail so well that he will not expect us to follow it beyond the grassy space, and probably not so far. As soon as he reaches the basin he is almost certain to come out on a rock point to look down and see if the coast is clear. He knows this country. But I know Scott Ashton. This is his trail all right but I guess it doesn't go much farther."

Ashton sat on top of a cliff more than a thousand feet above and watched his bewildered trailers in the grassy space below. Though out of his sight where they stood talking he had covered his trail so thoroughly that he felt no concern.

Presently Moore said: "You fellows ride back across the open and for a time keep out of sight behind those buttes. Then come forward and again search all over the region. Take plenty of time."

Reaching Lost Basin, Ashton had thrown off the saddle and the richly stuffed saddle bags. He picketed the tired, hungry pony in the grass, and then climbed to the top of the cliff. He had in mind to camp in this retreat a day or two, then go back down to the road and proceed where he liked. He was eagerly watching the confused search of the foreman and the cowboy.

Moore came crawling along his trail. Then the unexpected happened. The moment that Moore appeared the picketed pony greeted him with a whinny.

This was warning enough for Scott Ashton. He scrambled down the opposite side of the cliff. Moore, anticipating this move, hurried around to head him off. But Ashton had made his get-away in the woods and crags beyond.

In such a region, it was suicidal for Moore to follow so skilful a man. He went back to the horse and found the $20,000 in the saddlebags. He then fired two shots and began slowly leading the horse down the steep mountain side.

CHAPTER IX

THE HAPPY-GO-LUCKY BLACK BEAR

ONE windy autumn day I sat in a mountain forest watching pine cones bouncing and rolling across a steep, grassy opening. A black bear started across the opening. A cone struck near by and bounced high, slightly in front of him. He leaped for it, striking with left forepaw. Two other cones dropped, and after these like lightning to right and left he rushed; then came three or four cones at once. He stood still and with his eyes followed one cone at a time, watching the ones that rolled farthest. One cone bounded and lodged in the fur of his back. Lazily he turned to look at it, and more lazily reached around, trying to get his teeth over it. Then he ran in a circle three or four times, stopped, looked at the cone, then circled again. He rolled over, picked up the cone, dropped it, picked it up again, turned to look at the falling cones, then walked on into the woods with nothing on his mind.

The Indian has given many an animal a name that is a key to its character. But he never hit

upon a name for the black bear better than the one given by a white hunter—the "Happy Hooligan of the Woods." A million or more false stories have this bear ferociously chasing people up trees. Such show of energy would be too much trouble for the black bear and he is infinitely less dangerous than the old hen with chicks and the alleged tame cow.

The American black bear is a jolly loafer with no evil intentions; has the care-free indifference exhibited in Huckleberry Finn, and many of the lazy, mischievous traits of a boy. That rollicking farce, "The Arkansaw Bear," brings out better than any story I know the real character of this all-American animal.

Once I saw a little black bear in a woods opening; plainly he was lonesome. He did not know just what to do; he was ready to play and there was no one or anything to play with. A prickly porcupine came waddling along and the bear followed after, trying hard to play with him; but porky, dully, indifferently, went on into the woods. The bear sat down, dog-like, on his haunches and watched around for something to turn up.

I was watching a number of mountain sheep with a glass when a black bear came out of the woods near by and shuffled along toward the sheep, evidently following a wild-life trail in

which the sheep were standing. The sheep showed no interest in the bear and he none in the sheep. Passing a ram that stood by the trail, the bear, without any warning, and with a terrible bluff, hurled himself at the ram. He purposely fell short and instantly the ram came back with a head-on butt. The bear side-stepped sufficiently to break the force and received the butt on his hip. Without an increase of speed or without looking back the bear shuffled on and thirty feet farther hurled himself at a stump with blows right and left, as though he expected the stump to be frightened out by the roots. Then on he went without looking back. The black bear is ever bluffing, but even though a bluff be a ludicrous failure, a second later he tries again with uncooled enthusiasm.

Often I have had happy hours tracking the black bear. As soon as the sky cleared one morning after a heavy fall of snow, I started for a beaver colony. About a quarter of a mile from the cabin I came upon the tracks of a young black bear—evidently a year-old cub. The tracks were almost perfect moulds of bear feet—like bare human feet—in the wet, fresh snow. And the tracks were fresh, made since snow had stopped falling half an hour before. This was too good to miss, being so close to a cub, so I

followed the tracks. It might be that the cub was also going to the beaver colony. Before going on I looked ahead hoping to see him.

Following the bear's tracks they showed that he had seen a snowball rolling down the mountain side near him and turned to one side. The scattered snow pieces on a steep place showed that he must have seen the snowball coming down and struck it while still rolling.

Just beyond he evidently concluded to coast. He climbed a few steps to the top of a steep place. Commonly when a grizzly coasts he sits down in the snow and pushes himself going with a forepaw. But this young black bear threw himself forward and slid down on his stomach.

Some distance farther he had stopped to play with a willow. This had been bent down with wet snow, probably was just rising as he passed, and seeing it move he had stopped to play with it. He boxed it two or three times, then walked around it as though watching it or expecting it to make a jump. But it did not. After he started on he did the jumping.

His tracks showed that he had suddenly made a long jump behind a willow clump and from behind this he had peeked around, first one side and then the other, as he stood up on hind feet. What had frightened him? Going in the direction he had been going when he leaped behind the

Photo by Enos A. Mills

Part of the Beaver canal

Photo by J. A. Chapman

Last climb on Long's Peak. From an airplane

willow, I saw where a coyote had leaped among dead pine limbs after a rabbit; this crashing had caused cub to hide until he could discover what was happening.

The cub, too, had gone over to try to discover what had happened. But he had circled nearly around the danger point before going to it. The rabbit had escaped and the cub had followed the tracks and in two or three places had put his nose down into them to sniff. While about this a gopher moving under the snow had attracted him and he had walked slowly, with short steps, until close, then leaped and struck with left hand like a man after a grasshopper. A few drops of blood on the snow showed that he had made a capture.

The cub had gone to the beaver house and climbed on top; here he had clawed a few times then sat down dog-like. Then he had stuck his nose in the snow on top of the house to find out the nose-news from within, I suppose. As I stood on the house I could see tracks of something else that led behind a clump of pines about fifty feet away. Behind these pines a coyote had stood out of sight and, I suppose, watched the cub. This coyote had only three feet. One hind foot had been off for some time, for in a few places the stump had touched and left an impression in the snow which showed that it was healed.

Leaving the house top the cub had gone into a willowy place below the beaver dam. No tracks came out of the willows. I listened but could not hear anything. He probably was in there standing still, listening, and wondering which way I would go next. As I stood there a number of magpies in flying over the willows suddenly turned and alighted. They leaned forward to watch something. I imagined it might be the cub, possibly quietly digging out a mouse. I threw a stone which started a rush, followed by a line of willows scattering their snow as they were flung right and left. Presently on the mountain side the cub rushed out on the gallop. He stopped for one look and then crashed into a pine thicket. Back toward home I started, planning the following morning to back-track the cub and find out from the snow where he had spent the preceding night.

The black bear has more boy-like characteristics than any animal that I know. Like a boy, he has marked possibilities. Unfortunately, most bears in contact with people have been ruined by nagging and teasing. But I know of a few black bear pets that have been kindly treated and they responded nobly; they showed alertness, kindness, and loyalty.

At the Lake Hotel, Yellowstone National Park, a few years ago Mrs. George Frederick Diehl was nicknamed the "Bear Tamer" by the

guests, because of the intimacy that was established between the bears and Mrs. Diehl. She was uniformly calm, not a bit afraid of the bears, and exceptionally fond of them. This combination won their friendship. One of them followed her about eagerly and with the trust and devotion of a dog. All the bears of the locality were on their best behaviour in her presence.

The black bear has been exterminated over most of his former territory, but as, in most localities, he is a good mouser and has an economic standing in the realm of biology, wild-life conservationists in a number of states are urging a closed season to prevent complete extermination.

The black bear, *Ursus americanus*, originally was found over the greater part of North America. He shows slight variations, but his characteristics are everywhere essentially the same. Everywhere, I think, he is a skilful tree climber, using trees so much that he might be called a perching quadruped. But he is a good swimmer. He eats anything that is edible, except human flesh, and though fond of honey, many a bear probably dies without ever knowing what it is. As to colour, in many localities most black bears are brown or cinnamon, and judged by the colour test no one but an expert could tell a black from a grizzly.

CHAPTER X

A COLLIE IN THE DESERT

"TOO bad, Jack, but no one wants you and I can't take care of you," said the express agent as he dumped a shaggy brown puppy out of a crate into the street.

Jack simply sat for a while. There was nothing for a full-blooded collie to do. No one gave orders. Jack had never been away from his kennel until bought, crated, and shipped to this Arizona village. He was a stranger in a strange land. Two moth-eaten Mexican dogs snarled at him. A boy in passing threw a tin can at him; he dodged and ran to a burro; the burro chased and endeavoured to stamp him.

I glanced at the address on the crate and then asked the agent, "Who is George Rogers?"

"George Rogers was sent West to reform his health and his manners. But George did not reform his manners and when his mother shipped him a collie puppy he refused to remove it from the express office. I have cared for the puppy Jack for a few weeks, hoping to give him away.

But as no one wants him and as I can't keep him he'll have to shift for himself," said the agent.

Very strangely the life and the country must have struck Jack if he inherited memories of sheep, or of friendly, intimate association with man. Perhaps, too, he had memories of the misty climate of the Highlands when he looked out on the Arizona landscape of forests, mountains, and green valleys and the wide stretches of desert sand, picturesque cactus, and lonesome, sand-blown distances.

For several days the collie had only the scraps rejected or overlooked by the Mexican dogs. Finally he learned the places where scanty bits of food might possibly be found, and by being vigilant sometimes satisfied his hunger. He soon learned the ways of Mexican dogs, burros, and people. He went close to buildings only when searching for something to eat.

Day and night he kept to himself. He never went around the adobe houses where there were Mexican dogs. He usually lay daytime where he could look down the narrow, cluttered street and off beyond where the road led into the woods.

Two years afterward I came upon Jack on the outskirts of this Arizona village as he lay watching a number of goats near by. He was ready to take charge of the herd, to guard or to

drive it. He appeared to think that something ought to be done but he did not know what and no one came to tell him.

I sat and watched him for a long time. Except for a mere glance which told me that he knew of my presence, he paid no attention. The goats moved much nearer me and when Jack eagerly rose to follow them I spoke to him. He came close and lay down and looked far away to the horizon. Presently he came closer; at last he stood by my side and allowed me to pet him. There was a show of satisfaction but further than this no response.

This collie was no one's dog. He had never had a home and no longer seemed to miss one, but he was lost without work to do. Throughout his strange life he appeared to be ever in search of a flock of sheep and a master to direct him. Often he was seen to approach a lone cow or stray pig as though with a definite object in mind. But he never did more than to lie near, watching them. Thrust into an unfortunate environment, without a master, without any work or responsibility or any training, he simply grew up. He never had the chance to be the most that he was capable of, but perhaps he was better off than the other dogs of the town, for he was more wide-awake and more courageous. An ordinary cur dog will not seriously miss a master,

but Jack, with generations of development and intimate association with man behind him, needed direction, and without a master was alone in a lonely world.

One day a number of town loafers tried to lead Jack into the Mexican quarter of the village, in the hope of enticing him down the length of this narrow, noisy street. They wanted to watch the Mexican dogs chew him up. The street ran between two rows of squatty, ancient, dirty adobes, and was overrun with cur dogs that barked and snarled incessantly. When a lone stranger ventured into this quarter the Mexican dogs noisily mobilized for mass attacks, and lucky was he if he escaped without nipped legs and torn trousers. Any stray dog who wandered here was assailed by this riotous pack whose individuals were scattered from one end of the street to the other.

But Jack walked down the length of the street with proud, masterful carriage, conscious of his superiority. He was not in the least embarrassed or intimidated, and neither was he especially interested in anything. He took in at one glance the savage mongrel populace and radiated contempt for all the cur dogs of the earth. Barking ceased. The dogs dropped heads and tails; many slunk out of the way. They were curs and felt that he knew it; he was

their superior and knew that they felt it. Afterward, whenever he honoured the Mexican quarter with his presence, the dogs fawned on him and toadied to him. But Jack paid them not the slightest attention. From his manner it would have been suggested that their presence was unknown to him.

No one in the village appeared to have made any friendly advances. I was told that Jack's tracks in the dusty road frequently revealed that he wandered off at night. He was often known to have gone fifteen or twenty miles.

After more than two years of this indifferent life he was seen travelling away from town as though he knew where he was going. Evidently he had to be active, and perhaps, too, he needed companionship—either of man or beast. Jack was gone in the wilds for several weeks. Being the only collie in the Arizona town everyone noticed and discussed his absence. But no one searched for him.

He spent much of the time in the wilds, but occasionally returned to the village for longer or shorter stays. In one of these visits he was attracted to a woman who had recently come to Arizona and built a house on the mountain side about a mile from town. Starting home alone one night just at dark she was pleased to discover Jack following her. She spoke to him.

He was inclined to be friendly but declined to be petted. He walked close behind her until a man appeared in the trail ahead. Then Jack took the lead. When they were met by the woman's husband Jack paused for a moment as though to assure himself that she was well protected then trotted back down the trail.

The following day Mrs. Helm sought out Jack. He was excited and pleased with her attention and easily persuaded to go home with her. He received every attention and kindness but his life here did not fit his instincts. He never quite got used to being fed, and each time showed surprise. He had inherited the desire to serve but here he was served and treated almost like a toy dog. He did not have the opportunity to do anything, and he was capable of some big thing.

Jack was with Mrs. Helm only a short time when she moved to another town, taking him with her. But a few weeks later she was called East and left hurriedly. She remembered to plan for his welfare but the woman who was to care for him until her return suddenly died and again Jack was homeless and adrift.

He was seen with the coyotes miles from town, and in a territory more than one hundred miles from a region where I saw him three or four years later. He apparently took up his life with the coyotes. Little is known of his life

with them, except that wherever he went they appear to have accepted him as their leader, acknowledged his mental and physical superiority, and looked upon him with awe and admiration. Doubtless he asserted authority, and they may have revered him for his mastership.

The desert exacts many unusual actions from the life in its borders. The desert coyote from long life in these exacting scenes has become as clever as a fox and as durable and successful as the cactus and the sage among which he lives. He receives the cloud-bursts and the deadly desert dust storm. He ranges over an empire, knows its resources and the few wet spots that it affords. Most of the time the desert is extremely dry and the water holes and springs long distances apart. In many places the only water is salty or alkaline and too often polluted with dead snakes or rabbits or other life that died in the water or by it.

Many desert animals have developed the ability to go long periods without water. Desert antelope and sheep may not drink for a week. The camel and possibly one or two other animals have extra water reservoirs by the stomach, but most desert animals do not have this equipment. They are, however, able to do with but little water; perhaps one of the ways that enable them to survive with scanty water is that they

do not perspire. This is a saving, for many perspiring animals throw off one or more gallons of water each day.

Jack had the ability to adjust himself to conditions as they were and with these to succeed. The extreme trial for him must have been to stand the dust and the scarcity of water. He may have found it trying, too, to sustain himself on the desert, for the food of a desert coyote consists of birds, snakes, horned toads, an occasional taste of antelope or mountain sheep, the choice cuts of cactus, and all desert plants.

After Jack's troubled puppyhood the life of a desert coyote may have been pleasant for him. Coyotes commonly mate for life and generally they ramble about in pairs. But occasionally either for fun or from necessity they collect and move about in numbers, and usually under the command of a leader. At any rate, Jack met the exacting requirements of the desert and won the highest distinction of a coyote pack—that of leadership. Of course he won this through sheer force of character.

Either not quite content in his wild life, or else having a vague idea that he might find a master and a flock, Jack returned to the village. But he was restless and lingered only a few days. Then he wandered off again and cast his lot with the coyotes.

While studying the plant life and the geology of Arizona, a year or two later, I came upon Jack near Grand Cañon. In walking across the desert, two coyotes, as I supposed, crossed the trail in front of me. But as they speeded away the footwork of one of them lacked the deftness and lightness characteristic of the movement of the coyote. Also, his tail was held too high and was too much curled for the tail of a coyote. It must be the collie, Jack, I decided.

Jack had reverted to wild-dog life in the desert with the coyotes. As he and his mate moved off they were joined by a coyote who made a number of fawning attempts to play with him. But the newcomer was completely ignored by this large, aristocratic fellow. The last view that I had of this pair revealed the collie of the desert standing with his coyote mate near a solitary tree cactus on the dreary desert rim.

That night the air was marvellously clear. Stars, rank above rank, filled to vast depth that wondrous Arizona sky. I sat with a cowboy by his camp-fire, listening to the varied voices of the coyotes. A number were signalling, and occasionally the multitudinous efforts of one of these desert ventriloquists were followed by the merry and derisive laughter of the listening coyotes. Two or three times a lone and

commanding collie voice rose above the concert and brought a listening silence to the night. The cowboy told me that Jack had been living with the coyotes of this locality most of the time for a number of years, and that he had seen interesting glimpses of the dog's curious, misfit life.

While circling the scattered herd one day the cowboy had come upon five or six young calves, separated from the herd. A coyote and the collie came along without seeing him. The collie stopped and walked about the calves as though personally interested. The coyote watched Jack, plainly puzzled. Jack, too, was puzzled. His instincts probably called him to duty, yet just what this duty was apparently was not clear to him. I judge that his mental processes must have been: "Here are stray calves. It seems to me I ought to do something with them, but what?" Apparently he was confused, and finally lay down and watched the calves for a long time. At last he slunk away as though conscious of being unfaithful to a trust or shirking a duty. He turned to look back several times, always as though he was ashamed to have left the calves and half inclined to go back to guard them.

Once Jack and a coyote came upon a sheep herder. On seeing the flock and the herder

Jack became excited. He watched them for a few seconds and then hurried eagerly toward them. The coyote skulked near. The herder, thinking it was a cunning coyote trick to stampede his flock, fired at Jack. For a moment the collie stood still, baffled, and, I suppose, discouraged, and then retreated. The astonished herder looked after him and finally concluded that this must be the oft-heard-of collie of the desert.

The sheep herder had seen Jack a number of times near his flock. The first time Jack was watching a mirage, apparently of moving objects resembling cattle. At these Jack was looking all absorbed and did not see the close approach of the herder. The herder having once seen him noticed him later as he came to watch the flock from some distance off.

Apparently Jack was often searching for a master or looking for a flock. Now and then he was seen or heard. At times a collie howl rang out over the desert at twilight; again Jack was the royal one among a number of admiring coyotes.

I have often wondered concerning the unknown adventures of Jack as king of the coyotes. While with a prospector making a night move to the next water hole with his burros, a collie-coyote cry rang out strangely over the wide,

weird desert. Morning was rushing up red into the east—a flare of coloured light in the desert's coppery, sullen sky. The cry was repeated—neither a bark nor a howl—but suggestive of both. Before us on a low and lonely butte stood a collie with pointed nose against the brightening sky.

When Mrs. Helm, who had kept Jack for a time, returned to the West no trace of him could be found. She offered a reward, but the dog could not be located. She went to the town where she had first seen him. While there she heard stories of his restlessness and of his apparent desire for definite work to do, of his interest in cattle, and especially of his repeated attentions and interest in a sheep flock of a far-distant ranch. While she was away Jack appeared at her home in the other city. He awaited her coming.

As soon as she returned home she made haste to take Jack out with her to a sheep ranch for a few days. Jack enjoyed the work and the life. Plainly he was happy. For the first time he had something definite to do, and he quickly learned how to do it. Mrs. Helm concluded to buy the sheep ranch for Jack.

The ranch was owned by the express agent in the town where she had formerly lived. She sent for him.

As they stood watching Jack in the distance the agent told Mrs. Helm of his own unfortunate part in Jack's puppy life. And then for the first time she realized that Jack was the little collie she had sent West for her son.

CHAPTER XI

A WILD THOROUGHBRED

THERE were no claimants at the Bar "J" Ranch for the honour of breaking Black Diamond on "Bucking Day," as the day before the semi-annual round-up was called. The saddle horses had been assigned to the cowboys to be broken and made ready for the round-up.

It was noon. The morning had been filled with broncho-busting excitement. Numbers of bronchos, full of cussedness, full of fight and vitality, were eager to revenge old scores, and fought their riders at every point. Hardened by cruelty, wise with experience, they were determined not to be ridden. They were seemingly unconquerable.

Three of the boys had been tossed, and there was a lively battle of raillery and jest as they collected outside the ranch house waiting for dinner.

As a tall, long-stepping fellow came slouching up to the group, there was a suppressed snicker. To the cowboys he had that superior, self-

confident air which proclaims the tenderfoot. In addition to this, his extra tall, swaying figure struck them like the appearance of a caricature or a clown. But appearances aside, to arrive "on foot" is the surest way in cowboy land to be received with ridicule.

When dust-covered Sam Davis asked for a job, this was too much for the cowboys. There was sudden silence in the aggressive, noisy raillery. No one knew who he was, and, true to the frontier, no one cared. But their curiosity was aroused as to what he might be. He probably was a farmer, although he might be a section hand or a "mule skinner." But the foreman was short-handed and willing to take any one on.

"Can you ride?" the foreman asked.

"I guess I might," came the drawled answer. "I remember once of being on a horse, when I had to ride bareback and chase a herd of stray cattle out of Dad's cornfield."

"Have you a saddle?" interrupted the foreman.

"Naw, I ain't got no saddle. Do you haft to have a saddle?" There were loud guffaws from the seventeen cowboys.

Plainly annoyed at Sam's extreme greenness and tedious slowness of speech, the foreman replied, "Well, throw your feet under the table and have a feed. Then we will fix you out."

When Black Diamond was unloaded at the Bar "J" Ranch he was a handsome animal of perhaps seven summers, and with seven devils of activity and endurance. The blind, brutal methods of men in trying to break him had not subdued him, nor maddened him. Of the nearly four hundred saddle ponies on the ranch he was not only the finest looking, but probably had the most horse sense. But he was almost at the point of "looking for trouble." To appreciate him, you must know of his history—his past. In him we have a real horse whose career reads like strange fiction.

For three years the Butte Springs outfit had tried to capture Black Diamond—a black horse with a shining white star in his forehead. But proudly, defiantly, he still ran wild in the Great Basin. These cowboy-trained wild-horse hunters of Nevada had an exciting and an exacting occupation. They were just about one hundred per cent. efficient. And they needed to be, for the least desirable broncho which they captured had endurance and alertness and was exceedingly capable in taking care of himself. Many of these horses long succeeded in keeping beyond the reach of a rope, and were wary enough to detect the most skilfully placed and thoroughly camouflaged corral.

Everything that can be said for any thorough-

bred horse in the way of grace of line, of colour, of ease of action, of pride and head poise, could be said of Black Diamond. In addition, he had exceptional endurance and alertness. After all, he was a thoroughbred—a full-blooded Arabian. The Spanish conquerors of Mexico had brought in a number of thoroughbred Arabian horses. A few escaped and quickly produced herds of wild horses. They scattered northward and were assisted in rapid, wider distribution by the Indians. In a few decades there were thousands of wild horses in the Southwest.

These horses possessed all the good qualities of the original stock plus the additional development of a peculiar environment. The grasses of the plateaus were nourishing the year round. The high altitude gave increased lung development. There were carnivorous animal enemies and trying weather conditions which exacted great physical endurance and mental alertness. These horses may be said to have been raised under conditions, though different, as helpful for best results as man could have given them. Black Diamond had generations of these Nature-trained horses behind him, and possessed the transmitted triumphant traits.

The first drive for Black Diamond brought in sixty wild horses. Before they could be corralled, Black Diamond broke away and led all

but a few into the freedom of the wilds again. On the second drive, he was the only horse to escape. The following year additional help was recruited for a big, final drive. The morale of the cowboys in the drive was the best. The horses were to be driven up into a broad cañon. A cliff blocked the upper end and formed one side of a corral. A short stretch of fence barred one possible outlet and a deeply eroded, dry gully prevented escape on another side. The cowboys trusted themselves to hold the narrow entrance behind the horses if they succeeded in getting them into the corral.

About thirty horses came galloping over the alkali stretches, tossing their tangled manes, Black Diamond leading. The cowboys hurried up from three points of the compass to run them into the corral. In they dashed. Black Diamond discovered the trap and like lightning wheeled to escape. He avoided the cowboys and daringly sought escape across the gully.

In the lower end the gully split up into three branches with narrow, island-like, steep-walled bits of earth between. These tongue-like islands stood from ten to fifteen feet above the bottom of the gully. With a vigorous, picturesque leap Black Diamond cleared the first gully, landed on an island in safety, and then cleared the second. Racing along this narrow, tongue-like

stretch to its narrowest separation from the mainland, he made a splendid leap and cleared the third gully.

But the bank where Black Diamond landed was undermined and the jar of his landing caused it to collapse beneath him. He rolled into the gully fifteen feet below. But on his feet in a flash, rearing up almost vertically on hind legs, he reached up like a goat and climbed the nearly vertical, crumbling wall. Just as he gained the solid earth of the farther side the noose of one cowboy's rope fell over his neck and that of another caught a forefoot. In a few seconds Black Diamond was down and securely roped.

Though purely wild, Black Diamond was an animal who had full measure of what we call horse sense. He ceased to struggle with the rope the instant this became a waste of energy. Many wild horses when roped struggle until completely exhausted. They literally fight the men trying to secure them; they strike, bite, kick, and stamp. Occasionally a man is killed. Utmost skill is required to master one of these horses, for when in this fighting frame of mind, he is an extremely dangerous beast with which to deal.

The foreman of the horse hunters wanted Black Diamond for his personal use, and ordered him to be saddled and broken at once.

The usual method of breaking a horse who is at all spirited is to saddle him while blindfolded or tied. The cowboy swings into the saddle an instant in advance of the releasing of the ropes or removing of the blind. With quirt and spurs he endeavours to excite the horse to use energy rapidly, and to exhaust himself in ways least likely to disconcert the rider.

Black Diamond was a superior horse, but this was not even considered when it came to riding him. He was handled as though a man-killer. Each would-be rider in turn treated him like a beast. There was no opportunity for him to act calmly. However, he exerted little effort until the first would-be rider swung into the saddle. Then, so to speak, he "set things on fire." His moves to throw the cowboy were lightning-like and calculating. There were no mad, blind, exhausting efforts.

One, two, three riders, in rapid succession, he tossed to the earth. The instant the first rider was thrown the horse relaxed, and walked to the edge of the corral, seeing everything; but as there appeared no opening—no opportunity to escape—he put up his proud head and looked around. As a fourth crack rider swung desperately into the saddle, Black Diamond reared to the vertical, wheeled quickly, facing about, and came down on his forefeet so violently that the rider,

already tilted in the saddle, caught the shock on his left thigh. This snapped the bone and flung him heels over head to the earth.

The foreman ordered this outlaw—Black Diamond—to be shipped that night with two carloads of saddle ponies that were consigned to a Colorado cattle company for cowboy use.

At least a dozen of the crack ranch "busters" at Bar "J" Ranch "forked" Black Diamond, and each had been promptly and ingloriously tossed to the earth. Again an outlaw, Black Diamond was allowed to run with the other saddle stock that was unassigned. He had his freedom throughout the summer. He never made any trouble breaking away, as did some of the ponies when they were being driven into the corral.

He had won his reputation and often was the subject for conversation or banter. The mere mention of his name would instantly silence any cowboy who became unduly reminiscent concerning the bronchos he had elsewhere conquered.

After dinner the boys seated themselves in a row at the side of the barn for a little rest and a smoke before resuming broncho-busting activities. A job was framed up among them to assign "the outlaw"—Black Diamond—to Sam.

Upon inquiring concerning the use of the sub-

stantial and stockaded circular corral, Davis was told that it was used chiefly for the purpose of subduing refractory bronchos. Into this stockade the horses were driven, roped heels and head, thrown, and hog-tied.

"That's cruel. That's wrong," drawled Davis; but his comments were drowned amid the jeers and roars of the cowboys.

Davis was given a saddle and directed to the corral in which was his allotment of saddle ponies, including Black Diamond.

"Hey, there!" roared the foreman, "two or three of you fellows get a move on you and help Sam get Black Diamond."

Half the bunch leaped to their feet and came merrily forward, eager to help out for the privilege of being a close spectator of the exhibit which they had scheduled to take place when Sam made the acquaintance of the outlaw.

To the astonishment of everyone, Sam announced that he did not want any help, did not want any one to frighten his pony with their cruel and crazy methods. There was a quiet sneer and much nudging among the bunch as Davis, with coiled rope, started for the corral alone, whistling a low, lively tune.

He was a dark, athletic fellow, about thirty-five, and had the shuffling, straddling walk of the cowboy. As he strode off he rolled and lighted

a cigarette with startling dexterity. Young Porter, the wide-awake son of the ranch owner, realized from this dexterity that Davis might prove a star actor; he was, perhaps, about to give a startling performance.

Davis went into the corral alone. He stood for a moment. Getting his eyes on Black Diamond, he stopped whistling, commenced humming, and advanced slowly toward the horse, quietly edging his way among the ponies. Presently he not only had Black Diamond alone in the corner, but the horse was interested and curious concerning this big, slow-moving, quiet-going fellow. At last, Davis laid his hand gently upon Black Diamond's side, rubbed him easily, and commenced to talk to him in friendly tones.

Many a sensitive and superior horse has become an outlaw through clumsy or cruel handling. Just average thoughtfulness will improve any horse; most horses quickly respond to friendly advances, quiet movements, and even, friendly tones.

After a minute or two, Davis placed the rope over Black Diamond's head; swift, accurate moves of hands followed, and the rope became a hackamore that involved the horse's head. Turning, and still talking to him, Davis led the horse to the gate and then out of the corral.

The cowboys gasped. But this temporary

placidity on the part of Black Diamond, they thought, meant preparation for a more terrific explosion than he had ever shown. This exhibition would happen—it always had happened—the instant after the rider swung into the saddle.

Davis closed the gate, spoke a few words in an undertone to the horse, and then, without saddle or bridle, climbed awkwardly upon his back. The expectant cowboys held their breath. Horse and rider, in friendly unison, cut lightning-like circles and figures. Black Diamond plainly enjoyed the performance and made no attempt to dislodge his rider. The cowboys were overawed, sobered, and then amazed. Leaping off, Davis said, "Come, Black Diamond, follow me and I'll put a saddle on you." Black Diamond obeyed and followed!

The astounded cowboys did not wait to witness the second performance. They slipped away by ones and twos to attend to their own affairs!

CHAPTER XII

A BLIND GUIDE

IN THIS story Mr. Enos A. Mills, himself one of the most skilful and daring woodsmen in America, tells of another man's—Lou Crandall's—thrilling exploit: a "man hunt" that continued for three days and two nights, during which time the hunted man was without food. The knowledge which Crandall showed of nature and of the craftiness of the red men, and his wonderful memory which enabled him, after he had become blind, to lead his lost rescuers out of the wild and back to civilization, makes this a story that ranks with John Colter's as an adventure classic of the pioneer West. Mr. Mills obtained the facts from Crandall himself while they were working together in the Independence Mine in Cripple Creek in 1896.—WALTER P. MCGUIRE.

FOR a time Lou Crandall and George Williams were busy with the windlass which they were lowering into a prospect hole and no watch was kept. Although not even a trace of Indians had been seen, the instant the windlass was in place Crandall paused and looked cautiously around. This was in 1868. They were on the Blackfoot Indian Reservation in northern Idaho, from which the Indians had twice driven them with the warning never to

return. It was the first time that they had gone to their prospect hole unarmed. Usually, one had worked while the other watched, with rifles at hand.

There appeared to be a flattened form, on the edge of the spruce forest, crawling up through the grass of the meadow. While pretending to be examining the rope Crandall saw other forms each covered with grass and all slowly making their way toward them.

It was an ideal autumn day. The tapping of a woodpecker and the angry scolding of a Fremont squirrel were the only sounds in that primeval scene. The shadow of a cloud drifted leisurely across the silent, sunny meadow. Nature was in repose and apparently everything was serene.

The Blackfeet had surprised them. Crandall spoke to his partner in the bottom of the hole as though Indians were not discovered, and hammered away on the windlass while the partner climbed out. Then both made a dash for the woods, the cabin, and their rifles, less than a quarter of a mile away. Instantly, scores of Indians leaped up out of the grass and closed in on them in a small, almost complete circle. The cabin and rifles were never reached.

Five of the best Indian runners had been stationed in the edge of the woods between the

prospectors and their cabin. They were naked save for breechcloth and moccasins. As these five rushed out upon the prospectors, tomahawks in hand, most of the other Indians stopped and with jeers and hoots of derision set up a terrible yelling. Evidently they considered the prospectors captured.

Williams was the elder and the slower of the two. The woods were still one hundred yards away when an Indian crowded him so closely that only the audacity of Crandall prevented Williams's capture. He grabbed a stone, wheeled, and let it fly at the head of the nearest Indian. So true was Crandall's aim that the Indian flung himself to the earth to avoid it. In this brief pause two or three other Indians ran up dangerously close. Three tomahawks were thrown at Crandall, but rapid dodging to right and left as he ran saved him. Although the Indians were not swift enough to encircle the two men, it did appear that they would capture them before the woods could be reached.

It was a race for life. An Indian without a tomahawk rushed forward, evidently intending to seize and grapple with Williams or his companion. Crandall noticed that he was unarmed, watched for an opportunity, broke a dead limb from a tree, wheeled, and felled the astonished redskin.

In the woods both for a time outran the Indians. After several minutes Crandall ceased to hear his partner, so stopped, then went back a few steps and called. No answer. While listening, he caught sight of Indians sneaking up among the trees, so he turned and ran on. With boisterous yells the redskins gave chase. He could hear the heavy breathing of a closely pursuing Indian. He set his swiftest pace. Finally, when even the thumping of the Indian's feet could be heard no longer, he stopped to rest.

Crandall was twenty-seven years old, had wonderful endurance, and was one of the best of runners. But what had become of his partner? Crandall feared that the Indians had captured him but once more turned to see if he could not be found. Doubling on his trail, he climbed a tree near the edge of a wide, grassy space which he had crossed a few minutes before. He commanded a good view of the grassy open and the forest margin on the farther side. Here he watched, hoping to see Williams burst out of the woods. But he did not appear, nor was any trace of him ever found.

While Crandall watched, four Indians in single file came trooping out of the woods. The lead Indian was leaning forward, carefully watching the trail. The rear one occasionally glanced behind, while the others watched to right and

left. They paused briefly almost beneath him, then went forward on his trail.

As soon as the Indians were out of hearing Crandall slipped to the earth and hurried cautiously forward across the grassy opening. He had so carefully back-tracked that he felt certain the Indians would lose an hour or more before they could find his trail at the base of the tree.

It was more than one hundred miles to the nearest place of safety. He realized that to make Fort Lapway it would be wisest to travel as far as possible through the woods before crossing the open stretch of prairie. This forest was a narrow, ragged-edged strip between wide, grassy plains.

After journeying forward a couple of hours Crandall suddenly came upon a dim trail through the woods which he remembered having followed some weeks before. He recalled that a mile farther on the trail this strip of woods was deeply indented with a peninsula of prairie. Of course the Indians would know of this short way across the tongue of prairie, and would be pretty certain to follow it, thereby saving a mile or so, to head him off. Starting toward the edge of the woods he was suddenly aware of approaching footsteps and dropped behind a boulder. The four Indian runners passed near by and stopped in the edge of the woods only a few yards from him. Here they briefly con-

versed in low tones with a few accompanying gestures, and then separated.

Two took the short cut across the open, and the other two entered the woods behind Crandall. From his place behind the boulder he watched the two Indians cross the open and reenter the forest beyond. After a brief wait he audaciously followed the first two across the open. While they were searching for him in the woods he entered the woods beyond them.

Darkness came and Crandall left the woods and travelled in the open, but ever near the edge of the woods. Morning brought him to the end of the forest. As it would not do to travel the open in daylight, he must necessarily lie in hiding until night.

But before hiding he waded down the brook for a quarter of a mile, then left it and travelled a short distance beyond, as though starting across the prairie. Then, with utmost care to conceal his trail, he made his way back to the brook and waded up it some distance above the place where he had first entered it. Here he drew himself up into a tree by means of a limb that extended across the brook. From this he swung into another tree and came down upon rocky débris that showed no track nor hint of a trail. He climbed a crag and on the top of this, just at sunrise, lay down to wait for darkness.

Crandall did not allow his eyes to close. In mid-afternoon he saw Indians circling and carefully searching for a trail by the brook, near where he had left it. The cunning redskins examined the bottom of the brook for tracks; they picked up some twigs and spruce needles which he had broken off, then gazed excitedly into the treetops.

In vain they searched over concentric circles for the trail. One Indian scaled a neighbouring crag, while a second came to the base of the one upon which Crandall lay. Clutching one of several collected stones, he flattened himself upon the top surface of the crag and waited for the Indian to come up.

But the Indian did not come, and by and by all the redskins moved on and finally disappeared over a hill about a mile distant. Toward evening all but one of them returned and vanished in the woods. From their actions Crandall judged that they had abandoned pursuit. But what had become of the other Indian?

It was good to have a rest after eighteen strenuous hours. Without food, and his chances of escape not good, still Crandall did not doubt, nor was he in the least discouraged. That he might lose in this long, desperate race, never occurred to him.

From boyhood until the age of twenty-six

Crandall had been a trapper. In 1867, while in the region which is now the Yellowstone Park, stories of rich gold in the Blackfoot Reservation caused him to exchange his trapper's outfit for that of a prospector. Just after he had entered the reservation the Indians swept down upon him and his partner in camp. They had just time to throw their picks and shovels into a near-by beaver pond. The Indians, unable to find any evidence of their prospecting, told them to leave the reservation at once and not to return. When leaving, they encountered a rich outcropping of gold quartz and in a short time returned to this with a large pack outfit and eight companions. The Indians attacked them and captured all of their supplies. Crandall and three other prospectors escaped. The following year he and his partner procured a new outfit and made their way back to the place where the Indians had surprised them.

But to return to Crandall on the crag. When darkness fell upon the scene he climbed cautiously down and started forward across the open country, making a detour to the right to avoid the missing Indian. He had barely started when a rustling on his left startled and stopped him. He dropped to the earth and lay still. As he listened the rustling became more distinct and he thought of the lone Indian.

Then came a footfall on his right, promptly followed by a shuffling noise close behind him. He stiffened.

The multiplicity of sounds led him to believe that a number of Indians were surrounding him. Preparing to spring up in an attempt to break through the line, he was surprised by the snort of an elk. Relieved, he rose up, and a startled herd of elk thudded away in the darkness.

By sunup Crandall had separated himself from the Blackfoot country by so many miles that he felt safe to travel across the prairie by daylight. On he went, but he was ceaselessly vigilant. Much of the time he moved through a country so level and open that objects could be seen for miles. From time to time his eyes swept round the entire horizon; from the cover of hollows he surveyed the ridges and slopes ahead; he crawled across hilltops to avoid prominence on the skyline; and from the heights examined descending slopes before exposing himself upon them.

Every hour was exciting. During the morning upon a summit ahead he detected a slight movement that suggested a crawling, scouting Indian. Instantly he dropped into the grass. Presently a coyote came out on the skyline and revealed the identity of the uncertain.

A little after mid-day some objects rose on the

horizon and he dived into a bunch of willows until these advancing objects resolved themselves into antelope.

Toward evening, while trotting easily along, he stumbled and fell headlong. He had hardly gotten all the large cactus thorns out of his hand before he made another clumsy stumble. Angry with himself for such awkwardness, he sprang to his feet and started on the run only to fall heavily again.

Slowly he staggered to his feet, paused, and passed a trembling hand before his exhausted eyes. The strain had continued too long, and the intrepid Crandall had become blind out in the vast, lone prairie!

Probably not one man in a million could have endured the hardships that followed the race from the prospect hole. It had taken three days and two nights of severe and incessant use to exhaust his steadfast eyes. His oaken constitution now also faltered, and he sank to the earth, trembling with exhaustion. He had not had a mouthful to eat since this race for life started. A torturing pain pierced his eyes, and his leg muscles commenced to cramp violently.

With a desperate effort he blindly dragged himself into a cluster of sagebrush that might conceal him from the Indians. As he lay wondering what his fate would be, his ears detected

sounds of cautious footfalls. Thinking that the lone Indian was at last approaching, he clutched a stone, ready, though blind, for a desperate defence. Instead of an expected kick, a voice with an Emerald Isle accent asked, "What's the matter wid ye?"

A picket from a soldier camp near by had seen Crandall stumbling and had come to his rescue. Crandall was taken charge of, bathed, and his eyes dressed. By morning he was easier, but it was important that his eyes have early medical attention.

But the soldiers were *lost.* For three days they had been on half rations. Crandall volunteered to take command and lead the company on to Fort Lapway. Off all started with Crandall in the lead, lying upon a stretcher that was swung between two mules. The lieutenant was close behind. On each side of Crandall rode a soldier who from time to time described to him the topography on the right and on the left. With this information, Crandall unhesitatingly directed the way.

After three hours of advance the soldier on his left asked, "Shall I turn to the right or the left of the round grassy hills ahead?"

"How far away are the hills?" sharply asked Crandall.

"About one mile," answered the soldier.

"How many are there of them?"

"Four," came the answer.

"Well, what is on the right?" asked Crandall of his other lookout.

"There is a steep hill, grassy on the south and west but tree-covered on the north," was the answer.

"Is there a cliff of rocks with two trees on top of it about a mile farther on?" asked Crandall.

"Yes," was the answer.

"Can you see just to the right of this a forested ridge in the distance?"

"Yes," came half-a-dozen answers.

"Well, then," said Crandall, "aim for the cliff, go to the left of it, then aim for the lowest place in the forested ridge. I guess you will know where you are when we get on top of this ridge."

On they went, and that evening all arrived at the fort. Here Crandall spent a month in the military hospital before he could either see or walk.

True to pioneer and prospector characteristics, these three disastrous experiences were not discouraging to Crandall. At the fort he picked up another partner, and amid the falling of the aspens' golden leaves, again set off for the Blackfoot Reservation!

CHAPTER XIII

TRAMP DAYS OF GRIZZLY CUBS

A GRIZZLY bear cub has wilderness adventures that would delight the soul of any real boy—mountain climbing, swimming, exploring—no end of excitement and fun. He is a merry explorer of the wilderness. Prepared and preparing for what comes, he has a variety of experiences. In the period between separation from its mother and the selection of its home the cub is a fun-loving rover and has a jolly tramphood of about two years.

The tramp life of the cub is all the more lively and exciting where there are two or three cubs—brothers and sisters—to rove the wilds together. One of them becomes the leader. Both in fun and fighting the cubs are united, they are loyal to one another even unto death. They have two full summers and one or two winters together. Usually they separate during the third summer. Each then goes forth to select his own exclusive territory, and settles down to serious life alone.

Three grizzly cubs whom I saw a number of

times in the Saw Tooth Mountains of Idaho certainly had a lively, varied cubhood, one full of fun and adventure. A prospector had also watched them and told me some of their experiences. A hunter had killed the mother, wounded one cub slightly in a foreleg, and shot a toe off a second cub, the third cub being uninjured. The cubs made their escape. This was in September just after they were weaned. After being weaned, cubs usually run with the mother the remainder of the autumn and den up with her that winter. They leave her and go off together some time the next summer. Through the death of their mother, these cubs were left to look out for themselves earlier in life than is usual.

The cub who was wounded in the leg became the leader of the three. Whether he decided all their movements I cannot say, but whatever he did the others instantly fell in with. Adventure after adventure had this loyal band. They were inseparable playmates and united comrades in face of danger. Wherever they went the cub with the slight limp was invariably in the lead.

During wanderings this autumn they discovered the prospect hole in which my prospector friend was working. When he came up for lunch one day he saw the cubs in the edge of the

woods near by, apparently looking, all attention, at the windlass, or perhaps they were both looking and listening. On his appearance they stared for a few seconds and then ran off. The prospector occasionally ran a small suction air machine to help ventilate the tunnel and shaft. This caused a peculiar humming, rattling sound, and it may have been the sound made by it that attracted the attention of the cubs.

There was snow on the ground. On his way to his cabin the prospector saw the cubs' tracks. They had been travelling single file when they became interested in his place of work. All had risen up on hind feet and stood abreast, facing the place, evidently looking, smelling, and listening. Apparently while doing this they had taken alarm. After running back a short distance down their trail they stopped and again stood up. Tracks in the snow showed that they had waited some minutes trying to make up their minds what the excitement was about, and as to the next move they would make. Again advancing single file up the trail, they went beyond the place where they had first stopped and approached much closer to the prospect. But on reaching the edge of the woods they had evidently taken alarm again and retreated single file in their former tracks. They had proceeded once more to the edge of the woods when the prospector appeared.

Curiosity seems to be the most striking trait in grizzly bear nature. A grizzly is ever alert for anything unusual, anything that is new. New scents, new sounds, new figures, or even unusual or peculiar actions on the part of wild life, never fail to interest him. Ofttimes this extreme curiosity causes him to approach close to the interesting object in order that it may be seen to better advantage or its peculiarities comprehended. Every cub is full of curiosity.

The prospector was not a hunter. He saw the cubs three or four times that autumn and occasionally crossed their tracks. Once he came upon all three in the woods where they were digging, perhaps for some mice. Another time he saw all three on a rocky mountain side busily engaged eating the red, ripened fruit of the wild rose. A third time he saw them cross, single file, an opening by a beaver pond, cubs two and three carefully stepping in the tracks of the lame leader. Late that November, while returning from an examination of a mineral outcrop some miles from his cabin, he encountered their tracks, trailed them in the newly fallen snow a short distance, and found where they had all entered a den of their own digging. In this den the youngsters spent the winter.

Later when I visited this den it was simply a hole in the gravelly mountain side about six feet

deep. In this the cubs had evidently curled up together on the barren gravel. They did not use this den the second winter.

During the second autumn of their lives I saw these aggressive youngsters on the mountains at least twenty miles from the prospector's cabin. They were having a swim in a beaver pond, and no three swimming boys ever had more fun. They splashed water, they wrestled, and occasionally they boxed. I watched their pranks for more than an hour. For a week I followed them and had a number of peeps into their life. Just where they spent most nights I could not discover. But one night they lay close together under the edge of a willow clump at the foot of a steep forested mountain, with a thicket of willows in front of them and a cliff behind.

Another time I watched the cubs with field glasses while they were catching fish in a little stream that flowed into Red Fish Lake. While thus absorbed a deer came rustling through the willows near them. Evidently the cubs had not scented it. Though in no wise alarmed, they instantly endeavoured to see what it was. The leader happened to be standing near a much-branched tree that lay on the ground. He reared up, put forepaws against it, and peered intently ahead. The other two cubs, unable

to get a view either side of him, also reared up; the second cub put forepaws on the back of the leader and the one in the rear likewise upon the back of the second. In this position they looked intently, pointing noses slightly to right and to left as they looked, until the deer came out into the opening. Then, instantly they relaxed, and promptly single filed off upstream.

Although the cubs had been fishing, they had, apparently, between times been eating grass. One of them, as he stood up, presented a strange appearance with a few dozen long blades of grass projecting from between his tightly closed jaws.

One day I saw the cubs chasing and capturing grasshoppers in the edge of the woods. With fat bodies, they made a comical movie show as they slipped upon an alighted grasshopper or leaped into the air and struck after one that flew away. While I was watching the cubs an old grizzly came out of the woods and passed close to them without stopping, showing no objection to their presence. A grizzly will promptly drive off another old bear who prowls in his territory; but prowling cubs appear free to go anywhere. The cubs stood still and watched the old one out of sight, but showed no concern over his appearance.

I hoped to be fortunate enough sometime to see these cubs meet other roaming cubs of their

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second hunter before the latter saw him. With a right forepaw the cub knocked him headlong among the willows and cracked two ribs. Then he seized the man, shook him repeatedly, and bit him in the shoulder and in the thigh.

Meantime, the wounded cub had gotten on his feet. The lame one ceased mauling the hunter and began licking the injured cub's wounds. They were joined a minute later by the cub who had been watching the treed hunter, and all three vanished among the willows. A grizzly bear, young or old, will not attack a man unless first attacked, or unless he feels that he is cornered, or in defence of one of his number.

Dropping out of the tree the hunter hurriedly took his wounded comrade to camp and summoned help. From his graphic account of the fury of these charging cubs one could readily believe that a full-grown grizzly when stirred to fight, might, as Governor Clinton said a century ago, "defy the attacks of an entire tribe of Indians," armed as the Indians were with only bows and spears. The formidable manner in which grizzlies fight when driven to it, and not because of ferocity, was the chief reason why they were named *Ursus horribilis* and *Ursus horribilis imperator*.

The loyalty of a grizzly cub to his accompanying comrade or comrades is probably not

excelled in the world of animal life. Like the three Swiss on the mountain heights, they stand all for each other and each for all. In every emergency they appear to think only for the common good. The intense devotion which the mother shows for the cubs is in turn shown by each cub to the others.

There are numerous accounts in which grizzly pets have shown all that intense loyalty to man which we have ascribed only to the dog. Grizzlies have dared to die for their masters. Loyalty is a distinguished trait of the grizzly bear.

Evidently the wounded cub speedily recovered. Less than a month after this shooting the cubs stampeded a trapper's pack horse and put the trapper unceremoniously up a tree. He had set a bear trap, using stale meat for bait. Inside of forty-eight hours the cubs came near. They had caught the scent some distance off, turned, so their tracks showed, and come cautiously toward the trap. They had circled it and evidently paid more attention to the curious trap than to the bait. One of the cubs had reached out a paw, evidently to feel of the trap, and in so doing had sprung it, catching just two toes of his paw; but he was held fast.

The next day the trapper was moving his supplies to a permanent camp on his pack horse. He was close to the trap before the horse became

alarmed at bear scent and refused to go on. The trapper dismounted and tied the horse to a small pine, planning to advance with his rifle. The two cubs, loyal to their trapped comrade, had remained near. They charged the hunter and horse. The horse, excited, pulled violently, uprooted the pine, and fell over backward; then he stampeded wildly through the woods and willows. His pack was left partly in the willows and partly adhering to tree limbs. Everything was scattered.

The horse in falling had tumbled between the hunter and the charging cubs. These few seconds' delay enabled the hunter to climb into a tree before the cubs could be upon him. As grizzly bears cannot climb he escaped. During the confusion the trapped cub had tugged violently at the trap chain, which was fastened to a small broken log, and dragged this log for some distance when it became caught. In the surges which followed the cub tore off his two trapped toes. As soon as he was freed all three cubs hurried off into the woods.

During two seasons of exploring the cubs had covered a mountainous country about forty miles long by thirty miles wide—about twelve hundred square miles. After they separated they may or may not have spent any time in this region. No matter how chummy and inseparable when

tramping the woods together, after cubs separate they are not likely to meet again, or if they do meet as grown bears they are not likely to pay friendly attention to one another.

A grizzly, except a mother while with cubs, lives alone. Whether a cub simply wanders until he finds an unclaimed territory that he likes, or whether his mother sometimes selects his future home for him, is not known. But usually by the time a bear is three years old he has settled in some section. In this he lives alone, and in it, too, he dens up—hibernates—alone during the winter. Rarely does he leave his chosen locality, and then commonly for a short time only. A bear ever objects to another bear of the same species intruding on his claimed territory. So when a bear is away from home he is likely to keep on the move.

It is not known when or where these three loyal cub explorers finally parted. It may have been at the close of their second jolly summer when time to den up, or it may have been the spring following when they came forth from the den. After all their rambles, swims, feasts, and adventures together they separated. I wish I might have seen them at the time they parted for ever.

CHAPTER XIV

SNOWSLIDES FROM START TO FINISH

ONE snowy March evening I arrived on web snowshoes at a miners' boarding house high up in the Twelve Mile Range of mountains where snowslides are common in spring. I had come to see snowslides, and after I had spent all evening hearing the miners tell about them I was more anxious than ever to see how snowslides "run."

Next morning I was up early and all ready when the foreman came out and asked, "Has the Ferguson run yet? Well, then, tell Sullivan to start her." Looking in my direction, he added, "Tell him to take this fellow along."

I followed Sullivan's example and seized a ten-pound rock fragment on the dump, then hurried along, trying on web shoes to keep up with Sullivan's long skee strides.

"The Ferguson," I learned, as we hustled along, was the name of a gulch; and the thing the foreman wanted started was the snow in the upper end. Several times each winter, as soon as snow from storm or wind accumulated

in the gulch or on the summit rim, the snow ran out in a slide—the Ferguson slide. When it failed to start promptly of its own accord after a heavy snowstorm the miners started it. It was dangerous to use the road over the gulch, half a mile below, with the snowslide impending. A slide of several hundred tons of snow could rush the full length of the smooth, steep-sided gulch in a minute or less, although it was from a quarter to half a mile deep and more than a mile long.

The mine building stood on the top of the plateau a short distance from the head of the gulch. Whirling winds made a current down the gulch, but as they swept over the rim the current was broken and much of the wind-carried snow was dropped, forming in a few hours an enormous snow cornice at the upper rim of the gulch. Here we stopped.

"Throw her there," directed Sullivan.

My ten-pound rock made a snowy splash. Instantly a wagonload of snow slipped, then the entire cornice caved off and the whole mass of snow in the upper end of the gulch started sliding. With a rush and roar it swept down the gulch. Whirling, back-flying snow filled the sky above the cañon with snowflakes and snow dust. The Ferguson had run.

I climbed down the cleaned-out gulch and hurried eagerly to have a look at the snow that

had just run—the dead slide—but it took me nearly half an hour to traverse the distance which the slide by actual timing had made in fifty-two seconds. Occasionally, when there is more snow, the Ferguson slide coasts even farther than this one did, sometimes a quarter of a mile.

The big, white dump was spread out over a level flat and covered a space about three times the size of a baseball diamond, four feet deep in places. A part of the snow was jammed into big, icy snowballs, chunks as big as a barrel, but most of it looked like coarse white sand. The Ferguson ran so often that it kept the gulch well cleaned, and there was but little trash or gravel in the snow.

One windy day I came to a fresh snowslide dump where slides had run down three gulches that joined in a cañon and piled their snow and dirt in one huge heap to the depth of nearly one hundred feet. A wagon road was buried. But a tunnel had just been opened through this snowy blockade. Remains of this well-packed snow were still there the fourth of the following July.

Another day I climbed high up on the slopes of a peak, now called Mount Guyot I think, surrounded by cañons and steep, long slopes without number. Clinging to the sides of one of the sharp ridges that jutted out from the

plateau below were enormous snow cornices, drifted and formed by the winter winds. I saw several slides make rushing coasts, stirring up white dust and filling the air with crashing which the echoing mountain walls multiplied into riots.

Several times a slide in running dislodged rock piles or snow piles and these in turn developed other slides, making a tremendous, confusing uproar. An airplane in the sky above might have had a show of gigantic snowy rockets and meteors as the slides rushed down this slope and that, exploding here and there in dust columns as cliffs and walls were struck.

Head-on a slide ran into a cañon wall. The pressure and violence of striking had changed—frozen—the snow to ice. For more than one hundred and fifty feet up on the wall, ice, snow, and broken trees were frozen fast.

About noon a large snow cornice fell away and shot down the slope carrying numbers of snowdrifts along with it. After a long run it shot up the slope opposite, struck a big circular basin, circled, and finally slid down the wall of this back into its own track where it started up the slope. It had run a loop.

In the midst of an uproar I could hear crashes and booming from the slope opposite me. This steep slope was against a high plateau that

faced me and above this a precipitous walled peak stood up in the sky far above the timberline.

In rushing forward to see it I narrowly missed running in front of a monstrous breaker of a slide that was rushing up the slope. Rocks, dirty snow, and broken trees were tumbling in its front. Several broken trees stuck forward from its front at a dangerous angle: two of these dropped into the snow in front and were explosively torn out and crushed beneath the rushing mass.

This slide was a ponderous and chaotic affair. It had started on the peak opposite and about two thousand feet higher than where it nearly caught me. Down more than a mile of steep slope it had smashed its way, bringing trash, snow, and hundreds of trees with it. It must have been moving at high speed when it reached the bottom, and it was not in low gear when it passed me. And I was a quarter of a mile above the bottom.

On it rushed—still full of mountain momentum. Less than two hundred feet up the slope it rushed over the top of a ridge, rammed a gigantic snow cornice, filled the air with flying snow masses, and disappeared over the top in a whirling cloud of snowy white. By the time I reached the top it was tearing down the slope

half a mile below, completely concealed behind an enormous screen of snow-dust.

In the spring one cannot be certain where or when a slide will start. Big cañons are joined by several smaller cañons. A slide may run down one of these smaller cañons any hour. But all these slides run through the big cañon. I had just crossed a big cañon when three slides, each from a smaller cañon, rushed by like snow express trains.

Although slides run wild and simply refuse to be stopped until the coast is ended, they can be anchored or fastened so that they will not start. In numerous cañons and on most slopes the snow will not slip and slide unless hit by rocks or snow from overladen steeps above. Many mountain villages or mine buildings are effectively protected by anchoring the snow deposit which starts a slide and makes the trouble. I have seen slides corralled in this way—hog-tied as it were—so they could not start.

One mine which I visited was on a steep slope above the treeline and not far from the top of the mountains where winds blew deep drifts. Twice these snowdrifts had slipped, and the huge slides had swept down upon the buildings and carried them, smashed, to the bottom of the cañon a mile below. But for several years these snowdrifts had not slid, for they were

Photo by Enos A. Mills

A snow slideway through the woods

Photo by Enos A. Mills

Snow slide wreckage

securely anchored by four rows of stout posts across the slopes where snow accumulated. Sometimes stone walls are used for the purpose. The snow settles over, hangs on, is held fast.

At another place a slide came down a few times each winter between the two main buildings of a mine. As no effective way had been found to anchor the snow two men were placed on lookout after each snowstorm to fire warning shots the instant the slide started.

A slide may usually be heard. It roars or rushes crashing. But down in the bottom of a cañon where one cannot see far ahead the echoes stirred by a slide are confusing. Mountain walls echo and reëcho; cañons commonly are crooked; it ofttimes is difficult to determine the direction from which a slide is approaching. Being run down by a slide usually means death, but the number of slides in any snowy locality is not numerous and the number of people annually killed and injured by them commonly is fewer than a week's auto injuries in New York City.

Ice and snow in any form ever are slippery. Snowslides are brought about by heavy falls of snow on steep, smooth slopes, and by winds which sweep the snow off wide areas and drop it in drifts at the tops of slopes. But a snowslide could never occur in a level country no matter how much snow accumulated. I did,

however, see a small, lively snowslide rush off a big, steep barn roof, creating much excitement among us boys who were making a snow elephant a few feet away.

Probably more slides move during March than in any other month. Roughly, there are three kinds of slides, or rather, three sets of conditions that start slides. Slides that start during or shortly after a snowfall from the steep walls or slopes of cañons commonly follow the long-used channels made by streams or snowslides. These same channels may often be used by the slide that takes all winter to form. A part of each winter snowfall is drifted at the top of a mountain and after weeks a large drift results. There is a breaking up during the spring thaw in March and the winter's accumulation of snow slips and slides away. The third type of slide comes down over rough places where a slide has not before coasted. A slide of this kind may be formed by a wind from an unusual quarter drifting the snow heavily in a place where snow does not ordinarily drift; or, through several years' accumulation of snow and ice, winter after winter the pile grows larger and at last tips over, or its foundation—through much freezing and thawing—gives way.

Once a slide starts there seems to be no stopping it. It usually goes straight for the bottom

and one can see its long, gouged opening from starting to stopping place. But not always. A slide in a crooked cañon winds like a stream. Often if one starts down a fishhook-bent gulch it will follow the bends. But it may jump over a low wall; and, occasionally, when a slide is speeding down a crooked gulch, it jumps out.

I was one day walking serenely along the top of a cañon when a slide in the cañon concluded to jump out. Wildly rumbling and roaring, a mass of snow and snow-dust suddenly shot up and out at me. In the cloud of snow-dust I lost sight of everything. Then came a rush of wind, and through the cleared air I saw the slide turn a somersault out of a cañon and land on its back on the wall opposite. For half a minute or longer a great white column of smoke screen snow-powder and snow-dust filled the cañon and rose higher and higher until it was perhaps a quarter of a mile high. In rushing down the cañon and in ramming the wall, tons of snow and ice had been crushed to powder and this caught up by the excited air had made a strange, grand display. I had seen slides do high-jumping, dive over cañons, side-swipe a wall and tip bottom side up, but this somersaulting was a new stunt for slides.

Well up the slope above Hoosier Pass I found an old snowdrift which had lain for years. It

was more like ice than snow. But there was not enough ice to make a glacier nor was the rough wooded slope steep enough for the ice and snow to slide and run down. So there it lay, lasting through many summers and getting larger each year. It must have weighed a few thousand tons. It was top-heavy and leaning forward. If it fell to the east, down a slope it would go; if it tumbled to the north, it would plunge down a gully, then down a slope. But whichever way it went a little more of spring warmth and its icy moorings would release it. A stream of water from a spring thaw on a warm slope was undermining one corner.

In crossing a cañon to the cabin of a prospector I looked back over my shoulder to see that it was not starting as I began to descend the slope. But the cabin which stood a stone's throw from the bottom of the gully seemed safe from snowslides.

In the little log cabin the prospector and I had a happy evening. We sat late by the sheet-iron stove while I listened to his experiences with bears, Indians, and snowslides. In Idaho he had worked two years driving a tunnel into a mountain side. All the wood burned during this time was from a mass of forest wreckage brought down by a slide. So big was the pile that all he used made but little showing on it.

"Yes," he said, "the slide is likely to break loose any hour. It will smash through several stretches of forest in going down the mile or more of steep slope to the bottom of the cañon. There will be a vast pile of broken timber, rocks large and small, and quantities of dirty snow and ice in one big mass together. But I think the cabin is secure from slides, although the big snow- and ice-field when it runs will come close to it."

The next morning I climbed into the heights while the prospector climbed down a short distance to work in a tunnel. Thinking to see the big old ice- and snow-field if it started to run I kept in sight of it most of the day. But it did not move, although others had moved or were moving. I saw a path where a number of slides had run; two had jumped over high cliffs. I heard others running in deep cañons where I could not see them, but the steamy clouds of white ice- and snow-powder which rolled up out of the cañon behind them were a wonder show. Often one can see this back streamer of snow-dust from a cañon when the slide itself is too far away to be heard or seen.

I found a slope where two slides had collided. One had slid for half a mile down a smooth slope and developed speed enough to carry it far up the opposite slope when it met another slide speed-

ing down. For two hundred feet around the snow was splashed with slide wreckage; broken trees, rocks, and ice had torn up the snow and plastered the trees on the side lines. It was a head-on collision. But one side of the slide coming down turned in after the crash and kept on going. After a few hundred feet it jumped over a cliff and wrecked a grove in the cañon.

On the way home I had a surprise, for I did not expect to be taken as a passenger on a slide. While I was snowshoeing down a smooth, steep mountain side the snow suddenly skinned off and slid, and my feet were knocked from under me. It was fortunate I soon reached some trees strong enough not to break from the shock, as some did, for my slide was just beginning to get into high speed when I was spilled off, breathless, with my clothes torn, portions of the slide jammed in my neck, and one snowshoe and my hat missing. The snowshoe I found hours later in the snow against a tree stump, but not my hat. I reached the prospector's cabin at midnight.

About ten o'clock the following morning, while I was repairing clothes and snowshoes, there came a crash and roar as though a dozen slides were running at once. Surely the old snow- and ice-field had slipped at last, and I would see it run.

I made a dash for the top of the woodpile. On the way an enormous rock, frozen to a mass of ice, ripped through the air and smashed off a big spruce just beyond the cabin. Had it struck the cabin only scattered kindling wood would have remained.

Then came a rush of wind which knocked me off the woodpile. The slide was upon me. Chunks of snow fell about and a wildly whirling cloud of snow-dust hid everything. I clapped a handkerchief over my nose to avoid smothering. There were rushing, rumbling, roaring, and trembling. A crash, and in the snow-filled air I saw the flying logs of the cabin. A gust of wind cleared the air as the tail end of the slide went by. Full speed I ran after it; the way was cleared of snow, but I was distanced in a flash.

The mountain side beyond the cañon commenced to boom, crash, and roar with echoes thick and fast, telling of the stir and intensity of the slide, which was dashing through slide rock, smashing through the woods, ramming cliffs, exploding as it went but never stopping, and giving off enough snow-dust for a windstorm.

Yes, the old snow- and ice-field had tipped over and come down to the cabin. The mere edge of the mass had hit the cabin. There must have been four or five thousand tons of snow, ice,

gravel, and rocks in the mass that started. But this was small compared with the quantity that reached the bottom of the cañon. Something was added to the slide every foot of the way. There were quantities of snow, rock piles, train-loads of gravel, huge rock fragments from cliffs, and several thousand forest trees.

A squirrel who had had his winter store of cones carried away and who evidently had narrowly escaped being caught, was greatly peeved with this performance. He chattered and scolded. As I came running along, his peppery temper was at its worst and he seemed to be denouncing all snowslides and everything in general.

At the bottom of a steep stretch the slide had smashed through a forest, uprooting or smashing off trees and making an opening thirty-four steps wide. At one place it had leaped and mowed off the trees several feet above the earth. Then mystery! Four trees in a line were left standing, though one of these was skinned of a quantity of its bark.

The ground beneath the slide had been swept bare; grass, trash, loose rocks, and snow were cleaned off and carried away. The four-foot snow-cover in the woods on the side lines was splashed and covered with trash and earthy, black snow. Many trees on the slide's edges were barked and numbers were leaning forward.

Most limbs were torn off from thirty to fifty feet above the earth. So I suppose the slide had been about thirty feet deep. Jamming in places had caused it to deepen or to throw up ice, rocks, or tree trunks into the air; these would smash things far above the top of the rushing slide.

The thing must have been several hundred feet long. Its wreckage at the bottom contained firewood enough to supply a village for a year. The cabin was in the vast mass of wreckage thrown together in fierce confusion in the bottom of the cañon; also the prospector's winter supplies and my snowshoes. But I had seen a big slide run.

CHAPTER XV

BILL McCLAIN—PROSPECTOR

A BLACK hungry dog came up the snowy road and stopped in front of the Graybird boarding house. The miners were just out from dinner, and were enjoying a few minutes of sunshine before returning to work.

The road was blockaded with ore wagons and their teams. The drivers had stopped in front of the house to exchange greeting with the miners.

The dog was a stranger in this camp and, finding the road blockaded, was at a loss as to the best way to turn. It was plain, too, that he had been mistreated, and apparently he was friendless.

He had barely stopped, when a miner in the group by the house called "Get out!" He gave a start, but hesitated. "Get down the hill, you cur!" shouted another. The dog turned, and gave an almost pathetic look down the mountain road he had just climbed. He lowered his head, but he did not move his feet. Evidently he had left a place where his

treatment had been so bad that he could not return.

At last he saw an apparent opening through an alley on his left. As this led away from the miners, he raised his head and started into it. Just as he entered, two well-fed dogs pounced upon him and forced him back into the road. Again he paused and glanced about almost hopelessly, apparently not knowing where to turn or what to do. He was hungry, homeless, and everywhere unwelcome.

While he hesitated, someone hurled an empty box at him, and several of the miners yelled "Get out!" He dodged the box, but held his ground. "Sick him, Jim," urged the miner who threw the box. Jim was a plump bulldog. At the forlorn dog the bulldog leaped.

The poor fellow gave one glance down the road, and then raised his head in defiance. Though hungry and weak, he evidently thought it would be better to fight a bulldog and die than to return to the place from which ill treatment had driven him.

He had seen better times. In fact, he had fared well. He had, moreover, been useful. Until a few weeks ago, Joe's eight years of life had been comfortably spent with a kind old prospector, Pat Regan. When his master died Joe was, by accident, turned out to

shift for himself. Up in the mountain snows this was hard. No one had any interest in him, and as for food, there was almost none to be found. Now that he was homeless, the other dogs in camp were snarly, and daily the bad boys had stoned him. Driven from his home camp, he was fated to receive unkindness at the first place where he stopped.

The bulldog sprang upon Joe, and a circle of miners closed in to see the fight. Joe was a large, shaggy fellow, and when not starved was exceptionally powerful.

At the start he easily held his own, and prevented the bulldog from doing him serious injury or from getting a deadly hold. Of course, in his famished condition, it would be a question of only a few minutes until he would weaken and be a victim of a bestial bulldog.

"Stop this fight!" came a sudden intense command from a tall miner with a gray beard. He thrust men right and left and broke through the circle as he gave the command. "Let them fight," roared a few. "Choke off your bulldog," he sternly demanded. "Choke him off," he repeated, "or I'll attend to you both," he said with terrible energy, as he glared at the owner of the bulldog. There were shouts and cheers as the owner of the bulldog made all haste and stopped the fight.

The man with the gray beard was Bill McClain, an intelligent old prospector and miner whom everyone in the district respected. "I promised Regan . . . " began McClain. Instantly there was a silence, every eye was on McClain, and everyone listened. He appeared to be speaking to every one, or to no one except himself and Joe. "I promised Regan that I would take care of Joe. Joe, where have you been since the day of the funeral?—I have tried everywhere to locate you." With this said, he started for his cabin without another word, while Joe, with head up and at ease, followed.

That evening George Williams, the owner of the bulldog, called at the McClain cabin. "I have called to apologize," he said. McClain, holding in his hand an open copy of a popular magazine, pointed to a chair. Joe, lying on the floor with head resting on his forepaws, looked up at Williams without a move.

"I thought there was good metal in you," responded McClain, "but I came near letting you go over the dump to-day."

"Well, I have disposed of the bulldog and done some thinking since you stopped the fight," followed Williams. McClain was silent for a time, and then said: "I am going to work my claims up Norton Gulch as soon as the snow is gone, and Clark, who has the eastern extension of the lead

I'm on, will also work his. He wants a partner; suppose you get out of this camp and join him. I'll arrange matters with him."

Snowdrifts still lingered here and there when McClain and his partner resumed work on their claim in Norton Gulch. A few days later Clark and Williams came up and started a tunnel on the Clark claim.

A dozen or more prospectors were working claims near by, and all had cabins close to McClain's. Joe came up with his new master. There were half a dozen other dogs in camp, but Joe was considered the worthy one, apparently, even by the other dogs.

Joe's old master had given him some good training, and this alone, with a large strain of shepherd blood, made him a dog worth while. During the daytime he stayed by the cabin. Usually he lay quietly, apparently not interested in anything and devoid of energy. One day, however, some ten burros, with picturesque packs, came along and stopped by the cabin. The door was open. Joe lay on the ground a few yards off, apparently asleep. The packer stopped to talk with one of the prospectors, and the burros took advantage of the stop to bray, graze about, explore scrap piles, and examine the display on three clothes lines. The dogs of the camp raced madly about, barking wildly

and bravely. The burros gave no heed to the commotion. Suddenly a score of long ears rose alertly, and ten noses pointed eagerly toward McClain's cabin. The burros had discovered its open door. One burro, eager with curiosity, forged ahead, evidently determined to eat everything in the cabin as quickly as possible, provided his pack would allow him to enter. He never got in. Joe hurled himself at the intruder as though a giant had flung him. In a minute not a burro was to be seen, but a rapidly drifting cloud of dust down the gulch indicated that they were still travelling.

Regan had trained Joe to carry wood and water. He carried the wood one stick at a time. In getting water, he held the bucket bail in his teeth, and with a quick nod of the head dipped and filled the bucket at a deep hole in the river. Of course he had a good influence on the other dogs. By the time yellow leaves on the aspen told of autumn, the dogs were far less noisy, and two of them were proudly carrying in the wood for their masters.

One after another of the prospectors "went out" for the winter, and by the time the snow began falling there were in the gulch only McClain, Clark, and Williams. These three were so pleased with the showing in their mines that they planned to remain all winter.

Several heavy snows fell early. These made McClain and his friends uneasy, for fear a snow-slide should come down the gulch. However, the heavy forest growth at the head of the gulch above showed that a century or longer had elapsed since a slide had "run." This was assuring, but the snow continued frequently to fall, and all agreed that it would be well to go out before spring, the time when most slides loosen and run.

The snow continued falling, and in places accumulated to great depth. At the head of the Norton Gulch the range rose precipitously for several hundred feet. This formed an excellent starting place for slides. That many slides had started from here was probable, but evidently they had been too small to run down into the woods.

The summit of the range, being exposed to the winds, was kept swept bare of snow. The snow from the summit accumulated in fields and cornices just to the leeward of the crest.

One day McClain called the attention of the others to an enormous, almost unsupported snow cornice clinging above the head of Norton Gulch. After a brief discussion all decided to abandon work at once and go down to the Graybird in the morning.

That evening O'Brien came up on skees with

the mail and told of heavy snows over the state and of a number of damaging slides down the range. All went early to bed. Joe as usual slept on the floor by McClain's bunk in the rear of the cabin.

Outside it was a white winter night, cold but not bitterly so. The almost full moon shone from a clear sky, and, with the snow, made a subdued, silvery and enchanting light. A little past midnight McClain awoke, and at once arose and dressed. He was a trifle uneasy. Several times he peered through the window at the range above the gulch. It stood out with surprising distinctness in the moonlight. The shadow of the cabin upon the snow was as dark and distinct as though carved from coal. The air was still, and the slender scattered fir trees stood tall, dark towers in the splendid, silent night. The deep shadows the moon made with them on the luminous snow stood out more distinctly than the trees themselves.

McClain sat down by the window and began repairing a strap on one of his skees. Pausing in his work for a look at the range, he beheld a snow-cloud covering the precipitous slope. This told him that a slide had started. As the slide might smash its way through the forest and sweep the gulch, he made a dash for the other cabins to awaken everyone. Joe remained at home.

With a roar and almost irresistible force, the slide smashed its way through the forest and came thundering down upon the prospectors.

McClain had awakened O'Brien, and was in the door of Clark's cabin, calling him and Williams, when the slide swept over all. The one cabin left standing was the one in which O'Brien had slept. All the others were crushed, and parts of them were carried far down the gulch, and left mingled with rocks and pieces of trees which the slide brought down from above.

Clark was carried, rolled in his blankets, several rods down the gulch, and then dropped in the snow without a scratch. He and O'Brien at once began a hasty search for the others. A quarter of a mile down the gulch they discovered one of Williams's feet sticking up through the snow. Quickly digging him out, they found him uninjured. Though he had been half smothered, a rest of an hour enabled him to join in the search for McClain.

A little while after daylight they came upon the wreck of McClain's cabin. On tearing this to pieces, they found Joe beneath with one forefoot crushed. They continued the search without cessation until mid-afternoon; but no trace of McClain could be found. The last spot examined was just below where Clark's cabin had stood. Here was a mass of snow,

stones, and timber. The searchers were nearly exhausted, and, feeling that by this time McClain surely was dead, the search was abandoned and all hands started for the Graybird. The plan was to return on the morrow with a number of miners, and continue the search for McClain's body.

The instant Joe was dug out, he began crawling around, smelling among the débris. He appeared to realize that somewhere his master must be beneath. He refused to go with the men, so there was nothing else to do but leave him.

A short distance down the gulch Williams stopped. He was troubled over leaving Joe behind. As he stood thinking, he heard the echo of a dog's bark on the mountain side above. Instantly he started back to Joe. The other men went on down the gulch. When he came in sight, Joe was trying to dig with his one sound paw. As Williams approached him, he began tearing furiously at timbers with his teeth. Once on the spot, Williams made haste to pry the timbers apart. Beneath lay McClain.

Though unconscious, badly bruised, and terribly chilled, he was still alive. In the cabin Williams quickly revived him. By this time the stars were shining.

As soon as McClain had rested and eaten a

little, he requested Williams to move him at once to the Graybird, as he feared two of his ribs were broken.

Hurriedly rigging a hand-sled of two pairs of skees, Williams wrapped McClain in blankets and bound him and Joe on the sled. Down through the gulch and over the ridge he guided and dragged the sled. Safely, at last, he landed Joe and his master at the Graybird Mine.

CHAPTER XVI

AN OPEN SEASON ON NATURE STORIES

ON THE northern slope of Battle Mountain one March day I came upon a hole in a deep snowdrift. Dirty tracks showed that a grizzly had come from his winter hibernating den. I had read in numerous stories that any bear is terribly hungry and ferocious after the long hibernating fast of four or five months; that in this starving condition, with food scarce, even the shy black bear will attack people, while a grizzly in the springtime is so desperate with hunger that he will go out of his way and even attack an armed hunter. All this seemed natural.

As this den was above timberline and about four miles from my cabin, I commenced to figure on the possibilities of this grizzly overhauling me before I reached home. I noticed the wind, and travelled so that he would not scent me; for a grizzly sometimes has word through his keen nose of the presence of a man a mile or more distant. I was just a boy, and not a large one, but I was enjoying life and had made plans

for years to come and did not want this grizzly to assimilate me.

I had gotten down into the woods and was about two miles from home when I came upon the grizzly's track again. My head would have made a good scrubbing brush—the way the hair stood up stiffly. Just what I might have done had the grizzly suddenly appeared cannot be guessed, but I turned aside and went a mile out of the way to avoid going through dense woods.

I began to feel less serious when my cabin was only half a mile off. Most of the remaining way was open with scattered pines. Ahead of me I could see what looked like the track of my pony; this was cheering. But when I came to these tracks—they were the grizzly's! Surely he must be hungry, to come down so close. I hardly knew whether to go home or not. I took the precaution to circle the cabin at good distance to see that the grizzly was not hidden behind it or lying in wait in the woodpile. Not seeing him, nor his tracks, I went on home.

This happened about thirty years ago. During the years since then I have been much among grizzlies, and have known them to eat anything under the sun that is edible, *except human flesh.*

Some unusual situation might arise that would cause a grizzly to attack a man without

being first cornered or attacked; but not one has ever attacked me. In every case that I have seen, when they attacked they were chased, cornered, or wounded, and were fighting in self-defence, or fighting because they thought it their only hope.

I saw a grizzly cornered and killed the second day after he came out of his hibernating den. A grizzly after hibernation—after fasting for four months and sleeping most of the time—is supposed to come out hungry, ragged, and weak. But this grizzly evidently had not read how he was expected to perform. After being chased by dogs through snow for a half day and cornered, he acted as though for at least four months he had been training for the fight of his life.

The grizzly, cornered between deep snowdrifts and a rocky wall, was fighting the dogs when we galloped up. Realizing that to escape he must cut his way out, he proceeded to do so.

There were two hunters and several dogs. When the scrap started I "spectatored" from a safety-first spruce limb twenty feet up. I had several good looks at the grizzly in action as he rushed the line. He was mad, but not at all worried. Like lightning he leaped, jumped, dodged, and struck right and left whenever the dogs crowded too close.

Suddenly one of the hunters called, "Look out!—he's coming!" I broke tree-climbing records; my horse broke his rope, and I did not catch up with him for two days. Meantime, there was barking and yelping of dogs, bang, whang of rifles, and crashings of brush. The grizzly scattered things like a well-placed high explosive shell.

He got through the line but fell dead a short distance beyond. Three of the dogs were dead, one so badly injured that it was shot, two others had broken legs, and one of the horses received a right or left swing that cracked two ribs. One of the hunters went to the hospital with a broken shoulder.

The grizzly was fat. In dressing him his stomach was cut open. There was not room in it for a mouse. Through long fasting it had been almost closed by the stomach walls contracting. This contraction during hibernation is common.

Generally a grizzly does but little eating for ten days or longer after coming out of the winter den. He is not hungry. He is fat and strong from long sleep and rest; and, besides, his stomach is so nearly closed from long disuse that he could hardly eat a snowbird. But I did not know these things about a grizzly that day coming off Battle Mountain. However, it would not surprise me to see in print before the end of a

year a story about a bear rushing hungry from his hibernating den and assailing a man with the intention of ferociously eating him.

Just now bears are becoming scarce and there is need for every boy to understand them. Bears are practically harmless; they eat many pests; they are among the most interesting of animals; and they are in danger of extermination.

Sometimes I hope to find a beaver family—two grown ones and several children—who understand English, that I may read to them a number of statements that have been printed about beavers. These would be:

Beavers are always at work.

They live on fish.

They regulate the weather.

They use their tails for trowels and hammers.

In a standard encyclopedia printed about ten years ago we read that beavers make a dam by driving stakes in a line across a stream, and then weave willows and small trees between these stakes. These stakes, too, where the water is strong, are sometimes as thick as a man's thigh. This same story was printed in another book about four hundred years ago.

Beavers have good teeth and could sharpen a stake of this kind, but what kind of a club, maul, or hammer one would use in driving it down has not been told; although one book about two

hundred years old says that he drove it with his tail. The beaver's tail is rubbery, is a good stuffed club, but would hardly do for pile driving.

Then to this assembled and attentive beaver family I would read that beavers saw trees down with their tails, that they may claim relationship to the sawfish; and read still further that a beaver skilfully uses his tail as a trowel and might thus be eligible to join the masons' union.

When they had stopped laughing and rolling about with amusement, I would read very solemnly to them that they were the greatest weather prophets on earth, and that so long as beavers live the Weather Bureau is one hundred per cent. non-essential. After their faces had become solemn and prophetic, I would read further that the weather for months to come can be known in advance each winter by the quantity of winter food harvested, by the thickness of mud plastering put on the house, and by other dependable autumn preparations.

If after all these they were not yet asleep, I might read the whopper of all. But first let us remember that the beaver does know a number of things. Most beavers build a substantial dam and a house that, with repairs, lasts for years; they dig wonderful canals; and they

are water engineers and pretty good woodsmen. Although good workers when they need to work, yet beavers avoid all useless work. Being efficient fellows, doing their best and planning ahead, they need to do but little work—say, not more than a month or two each year—and play the remainder of the time.

So imagine a beaver, who puts in weeks at a time exploring the wilds or playing with other beavers—imagine this successful, good-natured loafer having stories written about him that tell of his working every day, rising at four in the morning, and never stopping to have a picnic or to comb his thick fur. Well, I would not bore them by reading such solemn sermons, because beavers would think that something must be wrong with my education, and that safety first called them to dive into deep water.

Beavers are vegetarians, live chiefly on bark, with grass and berries incidental. They do not eat meat and fish. But ever so often we read of beavers ruining the fishing by hogging all the fish. The next time a beaver shows his head I may ask him what kind of bait is used, and if he loafs on the bank, smoking, while waiting for a bite.

Hunters say that wild geese and loons are wide-awake people and that skill is needed to get within shooting distance. Just how it came

about that many people think a goose has a foolish head is more than I can guess. It is common, too, to hear "as crazy as a loon," yet a loon is about as far from the crazy point as any bird that flies.

Stories send whole flocks of mountain sheep diving over cliffs or precipices with arms folded. Head on, they land at the bottom, their large, springy horns striking first and acting as shock absorbers. With this kind of a portable mattress on his head, the sheep does not, like the circus performer, need any one to place a thick mattress or a water tank for safe terminal facilities.

Twice I have seen sheep land upon their shock-breaking horns, but as this style of landing each time broke the neck of the sheep, it was not tried again. Ewes, and little lambs—as well as the rams—make jumps overboard, and as high and as daring ones as the rams; but the horns of the ewes are tiny, and the lambs do not have horns. So I suppose when this jumping story is revised and corrected, it will tell that the ewes and lambs ride through the air on the backs of the rams, like Mother Witch on a broomstick.

The stories about fights of big, owl-eyed divers with sharks, and devil-fish or octopuses used to thrill me. Later, when I visited the Florida coast, and while doing a little sailing off southern California, I asked sailors about fights with the

fierce fellows in the cañons and caves of the sea bottoms. They laughed. And twice I asked captains who had sailed around the world about their escapes from sharks and those giant spiders of the sea. They also laughed. Then, one day I called on a retired captain who had been a pearl hunter, a diver, an explorer of sea bottoms, and a hunter after the gold in sunken ships. "It may be true," he said, "that sharks and octopuses occasionally devour or drown someone, but I have not seen them do it, and I think that these stories, as Mark Twain said of the report of his own death, are 'greatly exaggerated'."

I have had many a hunt for ghosts, for frogs that made warts, and for ostriches that hid their heads in the sand; for ground-hogs who carried thermometers, furs, snowshoes, snow-glasses, foot-warmers, and extra heavy sleeping bags for all kinds of weather; but never has any one of these performed for me.

And then there are skunks, not bad fellows, always brushed and clean. They have given me more surprises than any wild fellow that I think of. In Arizona I was expecting every night to be bitten by a hydrophobia skunk, but every morning I was surprised to find that I had not yet gone mad, and during the day I was surprised not to find someone running amuck who had been vaccinated by them.

Frequently in the wilds I sat still for hours. I often had many surprises in the way of visiting birds and animals who came near. Several times a single skunk came near, and three or four times a mother skunk and children. I knew that each of the family had a surprise concealed on its person, and I was surprised that nothing was thrown at me.

Then another day I was many times surprised. Bees were buzzing about, and while I was edging off from them, I butted into a willow that was bending beneath a business gathering of a few hundred bees. They raised several points of order on me, and in getting away, I took a header over thick brush and crashed down almost upon the spraying end of a skunk. This was a surprise. But the range was high and the bees who met it turned tail. As I ran on I began to understand how skunks, as I had heard, had put hornets to rout, and had eaten a hornet's house and contents.

Most wild life are not tramps and gypsies but are likely to spend their days and finally die not far from where they were born. John Burke wrote me that for three years he kept track of a rabbit with a slit ear; and that for four summers the same robin returned to nest near the window of his room.

A chipmunk had a den in a V-shaped strip

of ground between two brooks, at one end of my cabin. If another chipmunk dared to come into it, he was promptly chased off; this particular land was claimed by the chipmunk who owned the den; he even objected to other chipmunks crossing it. But one day he had jumped across the brook and, standing on tiptoe, reached up and pulled down a big white lily and was stuffing it into his mouth with both hands, when another chipmunk who had a den near and claimed all the good things on this tract of land, rushed up and kicked my chipmunk into the brook. My chipmunk often played, and often sat watching the bluebirds and other chipmunks.

Most birds and animals have, or claim, a home territory—a plot of land on which they spend their lives—and they insist that other folks of like species keep off. They are extremely particular about invasions and the boundary line. I knew of a beaver who made his home for eighteen years in one pond, and a grizzly who claimed that all other grizzlies had no business in the spruce lake region—and he was there to see that no invaders got too far in. This grizzly often played, and had many a coast in the snow. Once, somewhat like two-legged folks, he went off on a trip more than one hundred miles away. But he returned in less than two weeks.

Most birds and animals work fewer days than

most people; and when it comes to playing, they do this regularly and often the year round.

Originally, this round world of ours was solid rock. Frost, chemical action, the wear and tear of wind and water caused the outside to decay. In many localities the soil covering of the earth is not more than a foot thick; areas in valleys and lowlands may be many feet, even hundreds of feet thick, but in most localities a boy with pick and shovel can, in a day, dig down to solid rock. And in mountainous regions the bony rocks of the earth are without any soil covering.

In dry regions of the West it is generally necessary to go down from fifty to a few hundred feet, mostly through rock, before water is struck between rock layers. Yet every once in a while we hear the story that the prairie dog digs down to water. Some digger! Of course, having so much room in these long, deep holes, something must be done with the room. Commonly a part of the same story says that prairie owls and rattlesnakes, which are fond of fat dog, live in the holes with the dogs. Prairie dogs, with their large towns and villages, live in a way that is full of interest, and among their interesting activities is that of keeping water and snakes beyond the city limits.

Prairie dogs, antelope, birds, and, in fact,

nearly all life on the desert, use but little water and go long periods without any. Camels have developed a hump or lump in which usually is stored condensed food, and an inner tank in which water is stored, and these kinds of preparedness enable him to travel for days without food or water. Many kinds of desert plants have some sort of a water storage tank that is filled during wet times and drawn on during dry periods. But of course all plants and animals simply have adapted themselves to conditions, and these conditions on the desert require them to get along with less water than does the life elsewhere.

The prairie dog's deep digging is one of the stories that have come from dry-land life; another story says that every day some desert birds go for water one hundred miles or so, while others have secret reservoirs beneath cactus to which they resort each night, have a few drinks, then so thoroughly camouflage the covering that only on rare occasions has any one ever discovered this non-leak water pocket.

There still are too many erroneous beliefs on the earth concerning wild life. The sea used to be thickly covered with superstitions. Everyone told Columbus it could not be done because off in the West the sea was boiling; that in places it was filled with men- and ship-swallowing monsters,

and no ship that had gone beyond a certain distance had ever returned. But Columbus sailed. Then, too, there was the Roman admiral who was told not to fight a sea battle for which he was ready, because the sacred chickens had that morning refused to eat. But the Admiral only said that then they must have water, and threw chickens, coops and all, into the sea and proceeded to capture the fleet of the enemy.

There still are many superstitions concerning high mountains. Eggs are not supposed to hatch more than a mile above sea-level, but the ptarmigan, rosy finch, and others have not heard of this, so they hatch eggs in nests two and a half miles above whale hunters.

Chamois and mountain sheep will continue to be great athletes until the news gets to them that altitude is harmful. And sickly lowlanders revive if sent to high altitudes. Altitude is helpful.

Lightning is the most striking thing outdoors. It seems to have habits, and sometimes it does the unexpected. When a boy, I often heard that lightning did not strike certain kinds of trees, and that there were other kinds on which there seemed to be an open season and a special bounty for smashing. But as a matter of fact, lightning will, or may, hit any tree; but a lone tree is a little more likely to be shocked

than those in company; and a broad-leafed—cottonwood say—more likely than a pine, simply because it has little or no pitch and is a better conductor than the pitch-blooded pine. And a tree rooted in wet soil is a better conductor for the juice than a tree rooted in a dry spot. But as I said, any tree may get struck.

Lightning, I had heard, never struck a beech tree. But in more than one state where I have seen beeches, old trees showed that they had been hit hard, and a few had been whacked twice.

Then, too, lightning does strike more than once in the same place. I have seen many trees with three or more lightning marks on them, and a pine one mile from my cabin was struck fourteen times in about twenty-two years, and these shocks did not kill it.

Lightning may strike high peaks, but it is more likely to strike in lowlands. Often a thunder storm is down on the side of the mountain with the high peaks sticking up through the clouds in the sunlight. So there is no sense in being more frightened about lightning on a mountain top than elsewhere; for, on the whole, there is less danger on a 14,000 foot peak than in the Mississippi Valley.

All over the continent I went camping without any lightning rod sticking up over me, and never expected to be struck. I was often told

that lightning never struck a mulberry tree, and many times was advised to take refuge under one. But I did not sit down against a big tree during a storm. Early I realized that if I tried to run away from lightning I might run the wrong way. Lightning was never on my nerves.

One day a violent lightning storm boomed and rumbled around me, and occasionally I heard a smash as though something had been struck. A tree several steps away showed that it had been branded by lightning. It was a mulberry tree. I was in another mulberry eating berries. Suddenly a high explosive dropped from on high and smashed one side off a mulberry not twenty feet from me.

Any one who has camped knows that there are twelve good months in the year, each of which might be called the camper's delight. Each month is more than ninety per cent. interesting; it may have some spots in it not to one's liking, but each has a number of special prizes, and lucky is the camper who has enjoyed the outdoors in every month.

Outdoors in January there are no flies, mosquitoes, snakes, rain, sunstroke, jiggers, gnats, and flu. But coasting, skating, tracking, and the camp-fire are at their best. On through the months the birds, flowers, trees, and animals are doing something, often exciting, that is not done

in any other month. Colds are caught mostly in a house, by those who live with windows closed and who eat enough for a camper without being one.

Years ago, when much of the outdoors was considered of low value, many people camped in the Yellowstone Park. In such a sloppy condition did they leave camps that the soldiers who cleaned up these camps called them "pig pens." But boy campers are becoming more numerous. Scouts, woodcrafters, and campfire girls understand wild life and set good examples by leaving camping places in clean condition.

I was following the trail of some friendly Indians several years ago, and was to get a pair of moccasins which they were to leave near camp, in a tree. After two hours' search the moccasins were discovered dangling from a tree limb. Although about a dozen Indians had spent two nights and a day in camp, so careful had they been, so completely had they cleaned the place, that I could not be certain just where this camp site was.

CHAPTER XVII

NATURE GUIDING AT HOME

LILY LAKE, two miles from my cabin, was a large beaver pond which the Arapahoe Indians called Beaver Lodge Lake. There were a number of beaver houses in it. A year before I came into the scene the lake temporarily went dry and the beavers migrated down into Wind River Cañon, to the west of the lake. A high, rocky mountain rose to the north of this lake, a grassy border was on the south, and near the east shore was a forest.

The lake refilled and continued to be a wild-life water hole where birds and animals frequently came, and sometimes gathered in numbers. Often I visited the lake, and among the callers whom I occasionally saw were bears, wildcats, mountain lions, mountain sheep, snowshoe rabbits, eagles, and many other kinds of birds.

It was a never-ending surprise to me that so many live things came to one place, and that so many different ways of birds and animals could be learned in one little spot.

The animals and birds had fights, feasts, and plays. I saw many of these wild-life exhibitions —real movies. By going frequently to this lake I often saw the beaver inhabitants and I learned a number of lively facts concerning many species of birds and animals.

So interesting was this place that for many years I went to it during every season of the year, and by moonlight as well as by daylight. Early one morning I saw a beaver with an unusually flat back come climbing up out of Wind River Cañon with several other beavers following him. I named him Flattop, and during the eighteen years that followed I occasionally saw him in or by the lake. A number of times I watched him and other beavers cutting trees and dragging them into the lake.

One windy winter day big ice cakes smashed the beaver house and a number of its inhabitants went down to the beaver colony in Wind River Cañon. Three of these were killed on the way, as fur and blood on the snow plainly showed.

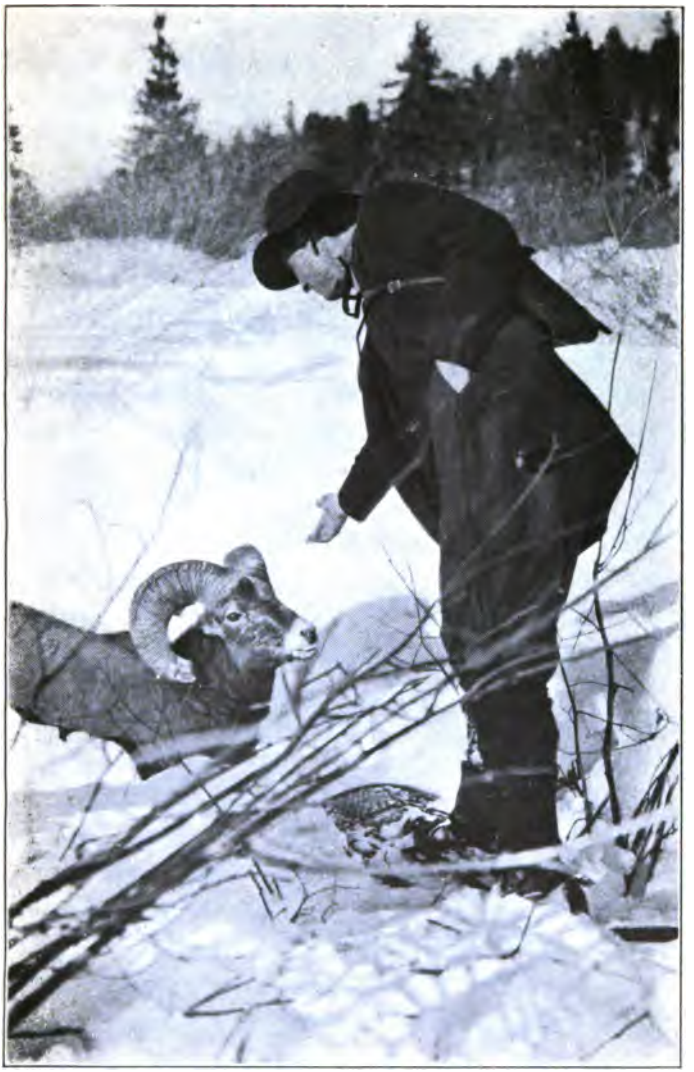
One rainy day while I was hidden and watching Flattop cut down a large aspen, a number of mountain sheep came into the scene. The ram leading saw Flattop and walked toward him pretending he was going to butt. Flattop stopped gnawing on the aspen and stood watching the ram, without a move. The ram smelled

him, stamped two or three times, then walked away.

By the lake I learned to identify many birds and animals, also flowers and trees. In addition to identification, I learned a number of the ways of each of these living visitors to the lake, and of those who lived in and by it. For several weeks I watched a ground-hog near his den on the west shore without knowing that he was a ground-hog. I noticed that the aspen grew in moist places, bloomed before its leaves came out, and that it was the favourite tree used by beavers, before I could learn its name and long before I learned its identification marks.

After seeing Flattop around the lake for a number of years I realized that most birds and animals cannot be called gypsies. They have a regular home near which they are ever found. Most of them live and die in the locality in which they are born. They claim a home territory and generally try to keep others of the same species from using this. Even the water birds, and the white-crowned sparrows that nested around the shore, came back to the lake after wintering hundreds of miles south. Three times a white-crown built in the same willow.

A little black bear was swimming in the lake one evening when I arrived. Two claws were missing from the left forefoot print in his track



After seven years of getting acquainted a Bighorn eats salt from the hand of Enos A. Mills

along the muddy shore. Once I saw this little bear tearing a log to pieces near the outlet of the lake; another time he was catching mice in the grass near the south shore. His territory was around this lake. I often tracked him, but never did these tracks lead more than two miles from the lake.

The same lion was three times seen near the lake. A ground-hog was seen so often that he came out and rolled in the sand, or ate dandelions within a few yards of me, only moving enough to prevent my stepping upon him when I walked by his home. After watching the ground-hog for six summers, a coyote who had lived near by for three years at last surprised him too far from his den.

About midway between my cabin and the lake was another ground-hog which I saw occasionally through five summers. In going to and from the lake I often saw the same chipmunk, or the same snowshoe rabbit in its exclusive home territory.

The trees along my trail to the lake I saw every month of the year. I noticed where the gentians lived, that their first bloom was close to the first day of August, and that the first yellow leaves were certain to be on the aspens that stood in the driest spot.

On each trip to the lake I saw tracks, fur,

feathers, scratches, and other signs that told me of many of the happenings since I was last along the trail. So many things did I enjoy on the way to and from and around this lake, that if to-day I were thrown on a wilderness island, or should go to a new home, I think I would follow my boyhood habit—would go often to the same spot, and there wait and watch for the numbers of wild folk who were certain to appear each day.

I also played home animal much of the time, and explored and revisited the places all around my home, seldom going far from it. Other places than the lake were frequently visited and watched. One of these I have described in "The Adventures of a Nature Guide." This often was as busy as a three-ring circus. This wilderness waiting place was by a brook in a grassy opening in a tall spruce wood.

One day a lion ran by close to where I sat watching. Not a footfall did I hear. He passed as silently as a shadow. A dead limb broke and fell from a tree. This sound alarmed a squirrel and he peeped from behind a tree toward the supposed danger, without showing himself. A passing coyote stopped at this sound. He did not move for half a minute; then he pointed his nose toward something under the grass, lifted one ear, turned his head, leaped, and picked up a

mouse in his teeth together with several grass-blades.

At Lily Lake and other watched places I sat on a log, on the side of a cliff, lay down by a log, squatted in a clump of bushes, and occasionally climbed a treetop. Far above the ground I was not likely to be either seen or scented.

There was no end of nature stories. At each place watched, and often on the way to it, I saw birds or animals, or both, do something that I had not seen before. While I did not have a line of traps out, by visiting places as regularly as though I had, I saw the tracks and other records which wild life had made at each place since the preceding visit; and often these records were almost as exciting as the wild life itself. These signs and the wild life either made a new story or another chapter of a continued story.

A dim trail which I followed to a watched place at timberline crossed a brook on a log that was fifteen or more feet above the water. Once I found a lion lying on this log. Another time, several magpies were playing upon it. Over the south end of the log in summer leaned tall stalks of mertensia, their blue blooms five feet above the earth. Higher still in winter was the top of a snowdrift. One January when I crossed the log this snowdrift showed that

during the five preceding days and nights it had been used as a bridge by squirrels, rabbits, porcupines, mice, weasels, and a number of mountain sheep. By the north end of the log, where during September a squirrel had piled pine cones, a coyote had crouched behind a spruce tree and watched for the squirrel. After a long wait he had turned and gone off into the spruce woods to look for something else to satisfy his hunger.

Trailing in the snow nearly always gave me a number of things to think about on each trip made. In following a grizzly for eight days and nights I had a book full of experiences; these, together with what I found to read about this great animal, made him more and more interesting. It was something of interest to know that the bear, dog, and the seal were, a million or so years ago, closely related.

In following one line of tracks I often came to where this was followed, or crossed, by other tracks; often I wanted to follow these new ones, and once I did. This was when, following the trail of a mountain sheep, I came to where it was crossed by the trail of a mother grizzly with only three feet, and her two cubs who stopped now and then to romp and wrestle in the snow.

When a boy, the good plan of learning to identify twenty-five or more birds, flowers, or animals had not been thought of. So I went about

doing things in my own way, and by chance it proved a good way at least for me.

This was getting well acquainted with home territory together with specializing on the best spots in it. John Burroughs wrote a number of books concerning experiences on his long-settled New York farm, and Fabre wrote several books about the small wild people in his yard. Many were the ways of trees, birds, and animals that I learned before I could identify any one of these. At Lily Lake and other beaver colonies I learned twenty-five or more stories about the beaver, and many of the ways of other animals, years before I learned to identify twenty-five birds and animals combined.

Among the numerous things which I had early seen a beaver do were:

Gnaw down trees.
Carry mud in hands.
Sit on his tail.
Carry mud and sticks between tail and stomach while swimming.
Dig a canal.
Kill a wildcat.
Run from a wolf.
Dredge mud from the bottom of the pond.
Wrestle and play with other beavers.
Build part of a dam.
Float a tree across a pond.

Scratch himself.
Brush flies off his nose.
Comb his fur with a double claw.
Whack the water with his tail.

These and other things seen in colonies the year round, the work and play of Mrs. and Mr. Beaver and the little beavers, gave me an excellent knowledge of beaver life.

While still a boy, a man came along and wanted someone to show him a beaver colony. I showed him three, and took all day for it. He asked questions about beaver life—I kept track, and it was forty-seven—all but three of which I readily answered, and in addition told him many things that I had seen of beaver life, which he did not ask about.

Two months later this man sent a whole party —men and women, and boys and girls—to me. All wanted to see a beaver colony. We spent the entire day in the Mora'ne beaver colony. Through the years I kept on going to this colony and on each trip I learned something new concerning it. During the years I have written six magazine articles concerning this one beaver colony.

A little later a New York newspaper man engaged me to guide him to Chasm Lake. This wild lake is on the side of Long's Peak and is about 12,000 feet above sea level. On the way

up I asked him why there were pines on the sunny wall of the cañon up which we climbed and spruces on the northerly facing wall; and I also asked why at timberline there were spruces, firs, and willows in the moist places and pines in the near-by dry places. I told him many things concerning glaciers—how they worked and how they dug lake basins and piled up moraines of rocks and soil.

I came to be considered a nature guide. At first I gave my services free, but as I was so often wanted, and had to work for a living, I began to charge for guiding. People wanted to see and hear about rocks, trees, birds, wild flowers, beavers, bears, and everything.

A surprise came when a man took me to Idaho to guide through a region I had not seen. But I knew how to start a fire, and Idaho wood and Colorado wood behaved about the same; Idaho grizzlies had a different bill of fare, but I found that what I had learned of Colorado grizzlies enabled me to understand them without an introduction.

And so it was during my camping trips in Canada, Alaska, and Mexico; the things that I had learned while in sight of my cabin made me more or less at home with the rocks, trees, animals, and beavers a thousand or more miles from home.

In guiding people I found that they cared

little for identification marks until they learned how living things made a living, what adventures were their lot, when and where the wild folks worked and played—especially how they played—and why each living thing lived in a particular locality. Just as people who want the story of Robinson Crusoe care little for the name of the author, or what the book looks like—they want to identify the book by knowing the story. So it is with the great story of Natural History; it is not the identification marks and brands of natural history figures that make the outdoors delightful and helpful. Ninety-nine per cent. of woodcraft is first-hand experience.

A tree that has more than a single leader or top point probably has had an adventure with wind, porcupine, a falling tree, insects, or something that removed the original single top. So when I see a double-topped tree I wonder what has happened in the treetop. And in treetops I have had adventures numerous and exciting; adventures with ants, with swarms of bees, with two skunks, with a porcupine, with breaking limbs, with two bear cubs, with a black bear under me coming up to see what I was like —who was not frightened, while I was frightened enough for both—and I have watched forest fires, rain- and wind-storms from treetops.

The information found in treetops and else-

where was useful in guiding. I had climbed Long's Peak more than forty times before I guided any one up. But I did not know too much about the peak; in fact, I learned something new each time I went to the top as a guide, notwithstanding that before guiding I had climbed it in rain, wind, summer, winter, daytime and at night.

Many people thought that high altitude was harmful and were ever expecting something unpleasant to happen to them. If I hurried them during the climb, or if they had banqueted the night before, something like seasickness did happen. But in due time I learned that altitude generally was helpful and not harmful.

Most people whom I guided thought that the wilderness was full of dangerous animals: that bears, lions, and wolves were waiting for a chance to kill and eat them. All wild animals in America flee at the approach of man. He has been too dangerous an animal himself for the wild animals to allow close approach, or for them to take any chances on coming close to him. Fear of man has developed wildness in most animals and caused them the world round to find safety first in wild retreat on his approach. Exceptions are rare, and there are more men likely to kill a man than there are wild animals likely to do so.

A wolf has never offered to attack me, but several tame dogs have. Any animal, and perhaps even a worm, will fight in defence of its life, but only when it cannot run away from the danger. The few cases of wild animals attacking people appear to have been those of animals mentally deranged.

I have been surprised and delighted in many out-of-the-way places by wild animals who were not afraid of me, but who came up for a friendly look, and to find out what sort of a new model of an animal I might be. In a side cañon of the Grand Cañon, a number of mountain sheep who evidently had not before seen man looked at me with intense, curious interest, then came up to smell of me.

In the Yellowstone Park, and in other wild-life refuges, birds and animals are tame, though wild. The grizzlies, except where they have been teased and overfed on garbage, are not even cross. And thus it is with wild life under many environments; it is ever responding—ever doing something interesting.

It is this understanding of the wilderness and its hundreds of inhabitants that makes it a wonderland; and this understanding a nature guide can speedily enable others to acquire and enjoy.

The giving of most attention on each trip to

one species of tree, bird, or animal, while gathering incidental information, is a good plan to practise. This idea may be extended over several trips. The nature guide should be a good all-round guide in natural history, and he may also be an expert concerning tree life, the beaver, butterflies, or geology.

The essential of nature guiding is a thorough understanding of something, and the ability to transfer this information clearly, entertainingly, to others. A guide must be able to talk—not too much—and in talking, say things in the right way. A guide, if he really knows principles, will be able to talk to one person in the field, or to many; he will rapidly learn to address those who listen around the camp-fire, or in a hall; or to write so that his ideas will be read by thousands.

Several times I have gone along as a nature guide in a region that I did not know, and received three times the wage of the other guide who knew only the way, and how to camp. People of all ages enjoy hearing the real facts concerning outdoor things. In Kansas City years ago a boy who was the son of a millionaire guided me among the bluffs and along the river. He did not charge for guiding. He was planning to be a farmer; he was a live, happy boy, and what he had learned outdoors had done more to develop him than all other experiences.

Often I have had people who were naturalists guide me through some place of interest. John Muir kindly showed me the Redwoods, and a celebrated geologist allowed me to camp with him for two weeks in and along the Grand Cañon.

On the other hand, I have been fortunate in having a number of people who are famous, each in a particular line, allow me to guide them afield.

Already there is need for one or more nature guides in every locality. In many of these the need is for expert guides who charge for their services. Every boy who knows the wild places near his home, or who understands intimately some one thing in the outdoors—why a living thing is where and what it is—will have many advantages that no other knowledge can give him. Outdoor experiences are educational and they are lastingly useful. Fortunate the boy who, like the bear, knows every nook and corner of his home territory.

The most likely places for paid nature guides are the National Parks, National Forests, State Parks, and wilderness spots in the mountains or by the sea, where people come to rest and exercise.

A nature guide who plans to continue in this for a life work, or for some years, will need to prepare

thoroughly for guiding. He needs to camp in wild places, and there study the trees, flowers, birds, rocks, animals, and insects, and supplement this with books and with talks with people who know. It requires as much preparation to become a top-notch guide as an author, lawyer, or engineer who is in class A. But I feel that guiding is more fun.

Nature—that is, the rocks with their stories, the streams, and wild life—is ever interesting. No matter what one's occupation, he wants, now and then, a vacation outdoors. If, as a boy, he was well enough acquainted with the wild life to be a guide, he will ever have something that will delightfully guide him during these vacations. And this wilderness lore will enable him a thousand times during his happy years to give a lively enjoyment to others.

THE END

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